Final
Programmatic Environmental Assessment

Demolition and Abandonment of Atlas and Titan Facilities

Vandenberg Air Force Base California

13 September 2005

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FINDING OF NO SIGNIFICANT IMPACT

Demolition and Abandonment of Atlas and Titan Facilities

Vandenberg Air Force Base, California

Pursuant to provisions of the National Environmental Policy Act (NEPA), 42 U.S. Code 4321 *et seq.*, implementing Council on Environmental Quality (CEQ) Regulations, 40 Code of Federal Regulations (CFR) 1500-1508, and 32 CFR Part 989, *Environmental Impact Analysis Process* (EIAP), the U.S. Air Force (Air Force) conducted an assessment of the potential environmental consequences associated with demolition and abandonment activities of various buildings and structures associated with the Atlas and Titan Heritage launch programs on Vandenberg Air Force Base (AFB), California.

Vandenberg AFB is headquarters to the 30th Space Wing, the Air Force Space Command unit that operates Vandenberg AFB and the Western Range. Vandenberg AFB operates as a missile test base and aerospace center, supporting west coast space launch activities for the Air Force, Department of Defense, National Aeronautics and Space Administration, and commercial contractors.

Vandenberg AFB is located on the south-central coast of California, approximately halfway between San Diego and San Francisco. The 99,100-acre base extends along approximately 35 miles of the Santa Barbara County coastline.

As the Atlas and Titan Heritage launch programs come to their conclusions, facilities associated with these programs on Vandenberg AFB will be returned to the 30th Civil Engineer Squadron Squadron (30 CES) over a period of several years for subsequent Air Force management. The 30 CES and the 30th Plans Office (30 SW/XP) have evaluated the need for retaining the various buildings and structures associated with these programs and have proposed to demolish or abandon a number of them for the following reasons:

- The buildings and structures do not provide infrastructure support or meet existing mission requirements where costs are covered by available base or program resources.
- The buildings and structures do not provide infrastructure support or meet identified future mission requirements where costs are covered by available base or program resources.
- The buildings and structures could provide infrastructure support or meet future, but currently unidentified missions; however, neither base nor program funds are available to maintain the facilities.
- The condition of the building or structure does not justify retention.

The Programmatic Environmental Assessment (PEA) (incorporated as an attachment to this finding) considered all potential impacts of the proposed action and alternatives, both as a solitary action and potentially in conjunction with other similar

projects. The PEA examined a representative set of buildings proposed for demolition or abandonment that would provide the Commander, 30th Space Wing and other reviewers of this document with an overview of the process to be followed and an analysis of potential environmental impacts. The PEA provides general environmental criteria and guidelines for proposed demolition and abandonment activities that can be used to avoid adverse environmental impacts. It analyzes activities that have the potential to affect both the natural and human environment. Further environmental impact analysis shall occur once preliminary engineering plans are available.

PROPOSED ACTION

The Proposed Action is to demolish or abandon Atlas and Titan Heritage launch program buildings no longer required to sustain either current or foreseeable Vandenberg AFB missions, and which are returned to the 30th Civil Engineer Squadron Real Estate Office. Buildings proposed for demolition or abandonment are located throughout Vandenberg AFB. Twenty-eight (28) buildings are located on North Vandenberg AFB and 35 buildings are located on South Vandenberg AFB.

The Proposed Action would entail the total above grade demolition, complete abandonment, or partial demolition and partial abandonment of specific structures at each of the buildings. The degree to which a building is demolished to above grade and then abandoned depends on the type of building and would be determined at the time of implementation of the Proposed Action. Actions that would be performed under the Proposed Action include:

- Pre-demolition biological, cultural, and environmental surveys, which would result in approval to proceed, conditional approval to proceed, or delay of approval to proceed.
- Abatement and management of asbestos, lead-based paints, or other human or environmental hazards.
- Deconstruction to facilitate the removal and management of selected items and to prepare the building for above grade structural demolition.
- Demolition of the building and above grade structural components.
- Demolition debris management, including segregation for subsequent reuse, recycling, or disposal of all building materials.
- Site restoration to grade level, to include infilling with inert demolition debris and appropriate fill material from existing Vandenberg AFB borrow pits, as required.
- Hydro-seeding with a seed mixture pre-approved by the 30th Civil Engineer Squadron Environmental Flight (30 CES/CEV), to minimize the potential for erosion and runoff.

Above grade concrete portions of buildings would be removed and the concrete would be segregated and crushed for use as engineered fill, road base, or aggregate for new concrete. Break-up of concrete could be accomplished by a variety of methods

including cutting saws, stingers, jack hammers, wrecking balls, sledge hammers, and explosives.

Steel portions of buildings would be cut into manageable pieces and sent to smelters for recycling. Methods proposed for bringing metal structures down to ground level include explosives, felling, systematic disassembly, and cutting.

Abandonment of buildings under the Proposed Action would entail ensuring the buildings are safe and secured against accidental intrusion by humans and wildlife to prevent endangering human health and safety and entrapment of wildlife.

Demolition and abandonment of the proposed buildings would occur over approximately a 10-year period starting in 2005 and concluding in 2015.

Implementation of the No-Action Alternative would result in the abandonment of buildings in-place once current facility occupants accomplished facility closure and turn-in procedures per 30th Space Wing Instruction 32-901, *Facility Closure Turn-In Procedures*. Over time the buildings would continue to deteriorate and have the potential to attract vectors or result in conditions that could pose a risk to human health and the environment as a result of structural failure and the release of hazardous materials.

SUMMARY OF FINDINGS

The analyses of the affected environment and environmental consequences of implementing the Proposed Action presented in the PEA concluded that with implementation of the project and monitoring measures described, no significant effects should result to Cultural Resources (Section 4.3), Hazardous Materials and Hazardous Waste Management (Section 4.4), Human Health and Safety (Section 4.5), Solid Waste Management (Section 4.7), Transportation (Section 4.8), and Water Resources (Section 4.9). All measures described in the PEA (Section 2.4) will be implemented to ensure adverse impacts are precluded. No cumulative adverse impacts will result from activities associated with the demolition and abandonment of Atlas and Titan Heritage launch program buildings, when considered in conjunction with recent past and future projects within the project area (Section 4.10).

Four areas of environmental consequences evaluated in the PEA were determined to have the potential to result in less than significant impacts to the environment.

Air Quality

Mobile source emissions would temporarily increase during demolition and abandonment activities, but would not exceed regulatory standards. No significant impacts are anticipated (see PEA Sections 3.1 and 4.1). Haul truck emissions from the Proposed Action would occur over a period of ten years, and be generated across Santa Barbara County. However, with the self-imposed emission limits as described in Section 4.1 of the PEA, the Proposed Action would not be considered significant.

All measures described in the PEA (Section 2.4.1) will be implemented to further decrease emissions during project activities.

Biological Resources

The federally endangered Gaviota tarplant (*Deinandra increscens* ssp. *villosa*) was documented on the eastern side of the Santa Ynez Water Plant (Buildings 1200 through 1209). Because buildings proposed for demolition at this facility are not located near the area where the plants occur, this special status plant species will not be affected.

A number of buildings and structures support various species of passerine birds, raptors and bats. To prevent the potential loss of nests, eggs or nestlings protected under the Migratory Bird Treaty Act, demolition of these buildings and structures would be scheduled outside of the breeding season for the species identified. To prevent entrapment of any of these species pre-construction surveys will be completed and appropriate exclusion measures will be implemented prior to the start of project activities as described in the PEA (Section 2.4.2). No significant impacts are anticipated (see PEA Sections 3.2 and 4.2).

Pre-construction surveys and monitoring as described in Section 2.4.2 would minimize any potential adverse impacts to wildlife species resulting from disturbances associated with demolition activities. No significant impacts are anticipated (see PEA Sections 3.2 and 4.2).

Cultural Resources

Two of the buildings to be demolished and a portion of the security fence at SLC-4 are within an archaeological site eligible for the National Register of Historic Places (NRHP). Although the sites significant qualities will not be affected by demolition activities, a qualified archaeologist and Native American will monitor demolition activities.

One cultural site, deemed a significant contributing element to the San Antonio Terrace Archaeological District, and eligible for the NRHP, extends into the vicinity of Building 1836 at the ABRES B launch complex. However, the site is more than 200 meters away and its significant qualities will not be affected by demolition activities at Building 1836. Archaeologists and a Native American familiar with the site will install fencing along the eastern edge of Tod Road to ensure vehicles and pedestrians stay on the road for the duration of the demolition work.

Three of the Radio Frequency Huts proposed for demolition (Buildings 1958, 1982, and 1992) are in or near archaeological sites. To ensure no resources are affected, only rubber-tired vehicles and equipment will be used during demolition activities at these three buildings. Motorized vehicles will be restricted to existing driveways, roads, and the graveled surface surrounding the buildings. An archaeologist and a Native American monitor will be present during demolition activities at the three buildings to ensure no archaeological deposits are inadvertently affected.

No significant impacts are anticipated on cultural resources (see PEA Sections 3.3 and 4.3). Implementation of the measures described above and in the PEA (Section 2.4.3) should prevent potential for minor impacts from occurring.

Land Use and Aesthetics

The Air Force will coordinate the Proposed Action with the California Coastal Commission to comply with the Coastal Zone Management Act.

Water Quality

Because the project would disturb an area greater than one acre, a National Pollutant Discharge Elimination System (NPDES) permit would be required to protect water resources. The NPDES Permit requires the development and implementation of a Storm Water Pollution Prevention Plan that includes preventative maintenance measures for equipment, spill prevention and response measures, sediment and soil erosion control measures, and identifies measures for management of runoff.

FINDING OF NO SIGNIFICANT IMPACT

Based upon our review of the facts and analyses contained in the attached PEA, conducted in accordance with the provisions of NEPA, the CEQ Regulations, AFI 32-7061, as amended by the interim change dated March 12, 2003, which adopted 32 CFR Part 989, we conclude that the Proposed Action should not have a significant environmental impact, either by itself or cumulatively with other ongoing projects at Vandenberg AFB. Accordingly, an Environmental Impact Statement is not required.

FINDING OF NO SIGNIFICANT IMPACT
CONCURRENCE PAGE

Programmatic Environmental Assessment for the Demolition and Abandonment of Atlas and Titan Facilities
Vandenberg Air Force Base, California

I concur with the Finding of No Significant Impact (FONSI)

Environmental, Safety, and Occupational Health Council Approval:

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Final

Programmatic Environmental Assessment

Demolition and Abandonment of Atlas and Titan Facilities

Vandenberg Air Force Base

California

Prepared for:

Department of the Air Force
30th Space Wing, Civil Engineering Squadron
Vandenberg Air Force Base, California

13 September 2005

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Acronyms, Abbreviations and Definition of Terms

Acronyms and Abbreviations

%	Percent
30 CES	30th Civil Engineer Squadron
30 CES/CEC	30th Civil Engineer Squadron Contracts Office
30 CES/CECBR	30th Civil Engineer Squadron Real Estate Office
30 CES/CEV	30th Civil Engineer Squadron Environmental Flight
30 CES/CEVPC	30th Civil Engineer Squadron Cultural Resources Section
30 SW	30th Space Wing
30 SW/SE	30th Space Wing Safety
30 SW/XP	30th Plans Office
AADT	Annual Average Daily Traffic
ABRES	Advanced Ballistic Missile Re-Entry System
ACM	Asbestos containing material
ACOE	U.S. Army Corps of Engineers
ADC	Alternate daily cover
ADT	Average Daily Traffic
AF	Air Force
AFB	Air Force Base
AFI	Air Force Instruction
AFOSH	Air Force Occupational Safety and Health
AMP	Asbestos Management Plan
ANSI	American National Standards Institute
AOC	Area of Concern
AOI	Area of Interest
AOU	American Ornithologists' Union
APCD	Air Pollution Control District
APE	Area of Potential Effect
Æ	Applied EarthWorks Inc.
Base Landfill	Vandenberg AFB Sanitary Landfill
BMP	Best Management Practice
C&D	Construction and demolition
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
Cal EPA	California Environmental Protection Agency
Cal OSHA	California Occupational Safety and Health Administration
CAP	Collection Accumulation Point
CARB	California Air Resources Board
CCA	California Coastal Act
CCR	California Code of Regulations
CDFG	California Department of Fish and Game
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CIWMB	California Integrated Waste Management Board
CNDDB	California Natural Diversity Database
CO	Carbon monoxide
CSC	California Species of Special Concern
CWA	Clean Water Act
CZMA	Coastal Zone Management Act

dB	Decibel
dBA	A-weighted decibel
DOD	Department of Defense
DRMO	Defense Reutilization and Marketing Office
EELV	Evolved Expendable Launch Vehicle
EMS	Environmental Management System
EO	Executive Order
EOD	Explosive Ordnance Disposal
EPA	Environmental Protection Agency
EPP	Environmental Protection Plan
ESA	Endangered Species Act
FE	Federal endangered species
FEMA	Federal Emergency Management Agency
FFSRA	Federal Facilities Site Remediation Agreement
FONSI	Finding of No Significant Impact
FPCON	Force Protection Condition
FR	Federal Register
GIS	Geographic Information System
H_2S	Hydrogen sulfide
HazMart	Hazardous Materials Pharmacy
HMMP	Hazardous Materials Management Plan
HPP	Historic Preservation Plan
HPTEM	High Performance Target Engine Measurement
HWMP	Hazardous Waste Management Plan
ICBM	Intercontinental Ballistic Missile
ICRMP	Integrated Cultural Resources Management Plan
IRP	Installation Restoration Program
LBP	Lead-based paint
LBPMP	Lead-Based Paint Management Plan
L_{eq1H}	One-hour average sound level
LOS	Level of Service
MBTA	Migratory Bird Treaty Act
MFH	Military family housing
mg/kg	Milligrams per kilogram
mg/L	Milligrams per liter
MoA	Memorandum of Agreement
NAAQS	National Ambient Air Quality Standards
NCA	Noise Control Act
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NO_2	Nitrogen dioxide
NOAA Fisheries	National Oceanic and Atmospheric Administration Fisheries Service
NO_x	Nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
O_3	Ozone
OSHA	Occupational Safety and Health Act
P2	Pollution prevention
Pb	Lead
PCB	Polychlorinated biphenyl
PCDD	Polychlorinated dibenzo dioxins
PCDF	Polychlorinated dibenzo furans
PEA	Programmatic Environmental Assessment
PHV	Peak-hour Volume
PM_{10}	Particulate matter 10 microns or less in diameter
$PM_{2.5}$	Particulate matter 2.5 microns or less in diameter

POL	Petroleum, oil and lubricant
PPA	Pollution Prevention Act
ppm	Parts per million
RCRA	Resource Conservation and Recovery Act
RF	Radio Frequency
ROC	Reactive organic compound
RTDS	Reutilization, transfer, donation and sale
RWD	Report of Waste Discharge
RWQCB	Regional Water Quality Control Board
SAIC	Science Applications International Corporation
SAP	Satellite accumulation point
SBCAPCD	Santa Barbara County Air Pollution Control District
SBCPD	Santa Barbara County Planning and Development Department
SE	California Endangered Species
SEL	Sound exposure level
SHPO	State Historic Preservation Office
SLC	Space Launch Complex
SO_2	Sulfur dioxide
SO_4	Sulfates
SR 135	State Route 135
SR 246	State Route 246
SWFP	Solid Waste Facility Permit
SWMP	Solid Waste Management Plan
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TNT	Trinitrotoluene
TSCA	Toxic Substances Control Act
TTLC	Total Threshold Limit Concentration
U.S. EPA	United States Environmental Protection Agency
U.S.	United States
UCSB	University of California Santa Barbara
US 1	U.S. Highway 1
US 101	U.S. Highway 101
USACERL	United States Army Construction Engineering Research Laboratory
USAF	U.S. Air Force
USC	United States Code
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UXO	Unexploded Ordnance
V/C	Volume-to-capacity
VOC	Volatile Organic Compound
WDR	Waste Discharge Requirement
WET	Waste Extraction Test
$\mu g/m^3$	micrograms per cubic meter

Definitions of Terms

Definitions of terms were extracted from Title 14 California Code of Regulations (14 CCR).

Assembly removal – Selective removal of specific building items or components; for example, rafters, joists or sheathing materials.

Construction work – Construction, remodeling, repair, demolition or deconstruction of buildings, other structures, roads, parking lots, and similar paved or covered surfaces.

Construction and demolition debris (C&D debris) – Solid waste that is a portion of the waste stream defined as "construction and demolition wastes," as defined in Section 17225.15 of Article 4 of Chapter 3, and means source separated or separated for reuse solid waste and recyclable materials, including commingled and separated materials, that result from construction work, that are not hazardous, as defined in 14 CCR, Title 22, section 66261.3 et seq., and that contain no more than 1% putrescible wastes by volume calculated on a monthly basis and the putrescible wastes do not constitute a nuisance, as determined by the Local Enforcement Agency.

CDI – Any combination of C&D debris and inert debris.

Deconstruction – The selective dismantling or removal of materials from buildings before or instead of demolition.

Demolition – The act or process of wrecking or destroying.

Demolition contractor – References in the PEA to the “demolition contractor” refer to the main contractor and all of its subcontractors including the explosives demolition contractor.

Fully cured asphalt – Means that the material must be at ambient temperature, be substantially hardened and be inelastic.

Inert debris – Solid waste and recyclable materials that are source separated or separated for reuse do not contain hazardous waste (as defined in 14 CCR, Title 22, Section 66261.3 et seq.) or soluble pollutants at concentrations in excess of applicable water quality objectives and do not contain significant quantities of decomposable waste. Inert debris may not contain more than 1 percent (%) putrescible wastes by volume calculated on a monthly basis and the putrescible wastes shall not constitute a nuisance, as determined by the Local Enforcement Agency. Gravel, rock, soil, sand and similar materials, whether processed or not, that have never been used in connection with any structure, development, or other human purpose are not inert debris and may be commingled with inert debris.

Inert debris engineered fill operation – A disposal activity exceeding one year in duration in which fully cured asphalt, uncontaminated concrete (including steel reinforcing rods embedded in the concrete), brick, ceramics, clay and clay products, which may be mixed with rock and soil, are spread on land in lifts and compacted under controlled conditions to achieve a uniform and dense mass, which is capable of supporting structural loading as necessary, and having other characteristics appropriate for an end use approved by all governmental agencies having jurisdiction (e.g., roads, building sites, or other improvements) where an engineered fill is required to facilitate productive use of the land. The engineered fill shall be constructed and compacted in accordance with all applicable laws and ordinances and shall be certified by a Civil Engineer, Certified Engineering Geologist, or similar professional licensed by the State of California.

Putrescible wastes – Solid wastes that are capable of being decomposed by micro-organisms with sufficient rapidity as to cause nuisances because of odors, vectors, gases, or other offensive conditions, and include materials such as, but not limited to food wastes, offal and dead animals.

Soft-stripping – The removal of specific building components or equipment prior to demolition of the structure; alternatively referred to as “cherry picking”.

Source separated – Materials, including commingled recyclables, that have been separated or kept separate from the solid waste stream, at the point of generation, for the purpose of additional sorting or processing those materials for recycling or reuse in order to return them to the economic mainstream in the form of raw material for new, reused, or reconstituted products which meet the quality standards necessary to be used in the marketplace.

Storage – The holding or stockpiling of processed or unprocessed C&D debris, C&D mulch, inert debris or recyclable materials for a temporary period, at the end of which the material either is recycled or is transferred elsewhere. Storage of C&D debris, C&D mulch, inert debris or recyclable materials for periods exceeding the

limits set in Article 5.9, is deemed to be disposal and shall be regulated as set forth in the Consolidated Regulations for Treatment, Storage, Processing or Disposal of Solid Waste (commencing at CCR, Title 27, Division 1, Subdivision 1, Chapter 1, Article 1, section 20005).

Type A inert debris – Includes but is not limited to concrete (including fiberglass or steel reinforcing bar embedded in the concrete), fully cured asphalt, glass, fiberglass, asphalt or fiberglass roofing shingles, brick, slag, ceramics, plaster, clay and clay products. Type A inert debris is waste that does not contain soluble pollutants at concentrations in excess of water quality objectives and has not been treated in order to reduce pollutants. The Integrated Waste Management Board, upon consultation with the State Water Resources Control Board, will determine on a case by case basis whether materials not listed in this subdivision qualify as Type A inert debris.

Universal wastes – Hazardous wastes that are generated by a wide variety of people. Examples include batteries and fluorescent tubes. Universal waste rules allow common, low-hazard wastes to be managed under less stringent requirements than other hazardous wastes. California's Universal Waste Rule became effective on February 8, 2002. Since that time, several other common wastes have been added to the list of universal wastes. These include mercury wastes, consumer electronic devices and cathode ray tubes (CRTs). (Department of Toxic Substances Control [DTSC] Reference Number, R-97-08.)

Exclusionary Provision of Article 5.9 Construction and Demolition and Inert Debris Transfer/Processing Regulatory Requirements

This Article does not apply to persons who generate C&D debris or inert debris in the course of carrying out construction, remodeling, repair, demolition or deconstruction of buildings, roads and other structures (collectively, "construction work") at the site of the construction work or to persons who own the land, buildings or other structures that are the object of the construction work, provided that such persons do not accept at the site any C&D debris or inert debris that is generated at any other location, unless it will be used in the construction work, and provided further that such persons do not allow C&D debris or inert debris, other than C&D debris or inert debris that is used in the construction work, to remain on the site of the construction work after the construction work is completed. For example, public works agencies constructing roads and bridges, road repair, airport runway construction, bridge and roadway work, levee work, flood control work, or landslide debris cleanup, and public and private contractors demolishing or constructing buildings are not subject to these regulations during the course of the construction work.

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Chapter 1. Purpose of and Need for the Proposed Action

The U.S. Air Force (USAF) is proposing to demolish or abandon various buildings and structures (here after referred to as "building" or buildings") associated with the Atlas and Titan Heritage launch programs on Vandenberg Air Force Base (AFB), California. This Programmatic Environmental Assessment (PEA) has been prepared to evaluate the potential environmental effects of implementing the Proposed Action and Alternatives, and addresses the programmatic aspects of demolition or abandonment of buildings proposed to occur during ten years (2005 through 2015).

Objectives of the PEA

The objective of this PEA is to examine a representative set of buildings proposed for demolition or abandonment that would provide the Commander, 30th Space Wing (30 SW), and other reviewers of this document with an overview of the process to be followed and an analysis of potential environmental impacts. The PEA provides general environmental criteria and guidelines for proposed demolition and abandonment activities that can be used to determine the appropriate level of environmental analysis required prior to implementing the Proposed Action. Buildings included under the Proposed Action are listed in Appendix A - Facilities Proposed for Demolition or Abandonment by the 30th Civil Engineer Squadron (30 CES) and Plans Office (30 SW/XP) (here after referred to as Disposition List). This PEA also provides management practices to decrease possible adverse impacts that have the potential to result from implementing the Proposed Action.

The results from this PEA include a set of environmental procedures for screening various categories of proposed demolition and abandonment activities, and for conducting supplemental environmental reviews prior to implementing the Proposed Action.

1.1. Background

The U.S. Air Force has made the decision to terminate the Atlas and Titan Heritage launch programs and replace them with the Evolved Expendable Launch Vehicle (EELV) program. Atlas and Titan facilities will be returned to 30 CES during several years. Facility return is contingent upon fluctuating last launch schedules, and the schedules of the Atlas and Titan contractors to prepare, vacate and return facilities to the 30 SW Real Estate Office (30 CES/CECBR), in accordance with 30 SW Instruction (30 SWI) 32-901, *Facility Closure/Turn-In Procedures*.

Environmental analysis and decision documents produced under the National Environmental Policy Act (NEPA) and Council on Environmental Quality (CEQ) regulations for the deployment of the EELV program did not address how Vandenberg AFB was to manage facilities no longer required by the Atlas and Titan programs (see USAF 1998a, 2000).

In coordination with other Vandenberg AFB agencies, 30 CES has developed a proposed management action for each of the facilities being vacated. The options to transfer, maintain, or abandon a facility can be executed within several weeks in accordance with established Air Force Real Estate procedures. However, execution of the demolition option may take up to ten years to complete. Funding and contracting of the demolition option is scheduled to start in late fiscal year 2005, and would continue over several additional years. Final contracting and initiation of demolitions should not occur until an environmental analysis and a decision document have been completed for the proposed demolition actions.

1.2. Project Location

Vandenberg AFB is headquarters for the 30 SW. The Air Force's primary missions at Vandenberg AFB are the launching and tracking of satellites into polar earth orbit, training missile and

space crews, testing and evaluating America's Intercontinental Ballistic Missile (ICBM) systems, and supporting aircraft tests in the Western Range (USAF 2004).

Vandenberg AFB is located on the south-central coast of California, approximately halfway between San Diego and San Francisco (Figure 1-1). The Base covers 99,099 acres in western Santa Barbara County (USAF 2004) and occurs in a transitional ecological region that includes the northern and southern distributional limits for many plant and animal species.

1.3. Purpose and Need

As the Atlas and Titan Heritage launch programs come to their conclusions, facilities associated with these programs on Vandenberg AFB will be returned to 30 CES over a period of several years for subsequent Air Force management. The 30 SW/XP and 30 CES have evaluated the need for retaining the various buildings associated with these programs and have proposed several management actions:

- Transfer of facilities to other users;
- Maintenance of facilities to meet future mission requirements;
- Abandonment of facilities; or
- Demolition of facilities.

To successfully support management of facilities resulting from the closeout of the Atlas and Titan Heritage launch programs the following operational and environmental criteria should be met:

- Provide facility and infrastructure support to existing mission requirements where costs are covered by available base and program customer resources. Follow established Space Use Panel and Real Estate processes.
- Provide facility and infrastructure support to identified, future mission requirements where costs are covered by available base and program customer resources. Follow established Space Use Panel, Real Estate, and 30 SW Plans processes.
- Retain facilities and infrastructure to support future, but currently unidentified mission requirements, so long as funding and facility condition justify retention. Follow established 30 CES facilities and infrastructure management directives.
- Facilities and infrastructure without current users, if retained, will be maintained in a condition that does not pose a threat to human health and safety, or the environment. Facilities will not become an attractive nuisance for humans or wildlife, nor become a visual blight upon the landscape.
- Buildings proposed for demolition will be removed in a manner that complies with all applicable and relevant environmental laws and regulations, especially the solid waste laws and regulations related to the management of construction and demolition debris.

1.4. Scope of the Environmental Assessment

Consistent with Title 32 Code of Federal Regulations (CFR) Part 989, and CEQ Regulations (40 CFR 1500-1508), the scope of analysis presented in this PEA is defined by the potential range of environmental impacts resulting from implementing the Proposed Action and Alternatives. Pursuant to 40 CFR Part 1501.4(c), resources potentially impacted are considered in greater detail in order to provide sufficient evidence and analysis to determine whether or not to prepare an environmental impact statement.

This PEA identifies, describes and evaluates the potential environmental impacts that could result from the Proposed Action, the No-Action Alternative, and other viable alternatives, as well as possible cumulative impacts from other past, present and planned actions on Vandenberg AFB. In, addition, the PEA identifies environmental permits relevant to the Proposed Action. As appropriate, the PEA describes, in terms of a regional overview or a site-specific description, the affected environment and environmental consequences of the action. Finally, the PEA identifies management measures to prevent or minimize environmental impacts.

The scope of this environmental analysis is limited to the 30 CES facility management options of abandonment and demolition, once the facilities have been returned to 30 CES/CECBR and the facility transfer and maintenance options have been examined, and deemed not to support mission objectives.

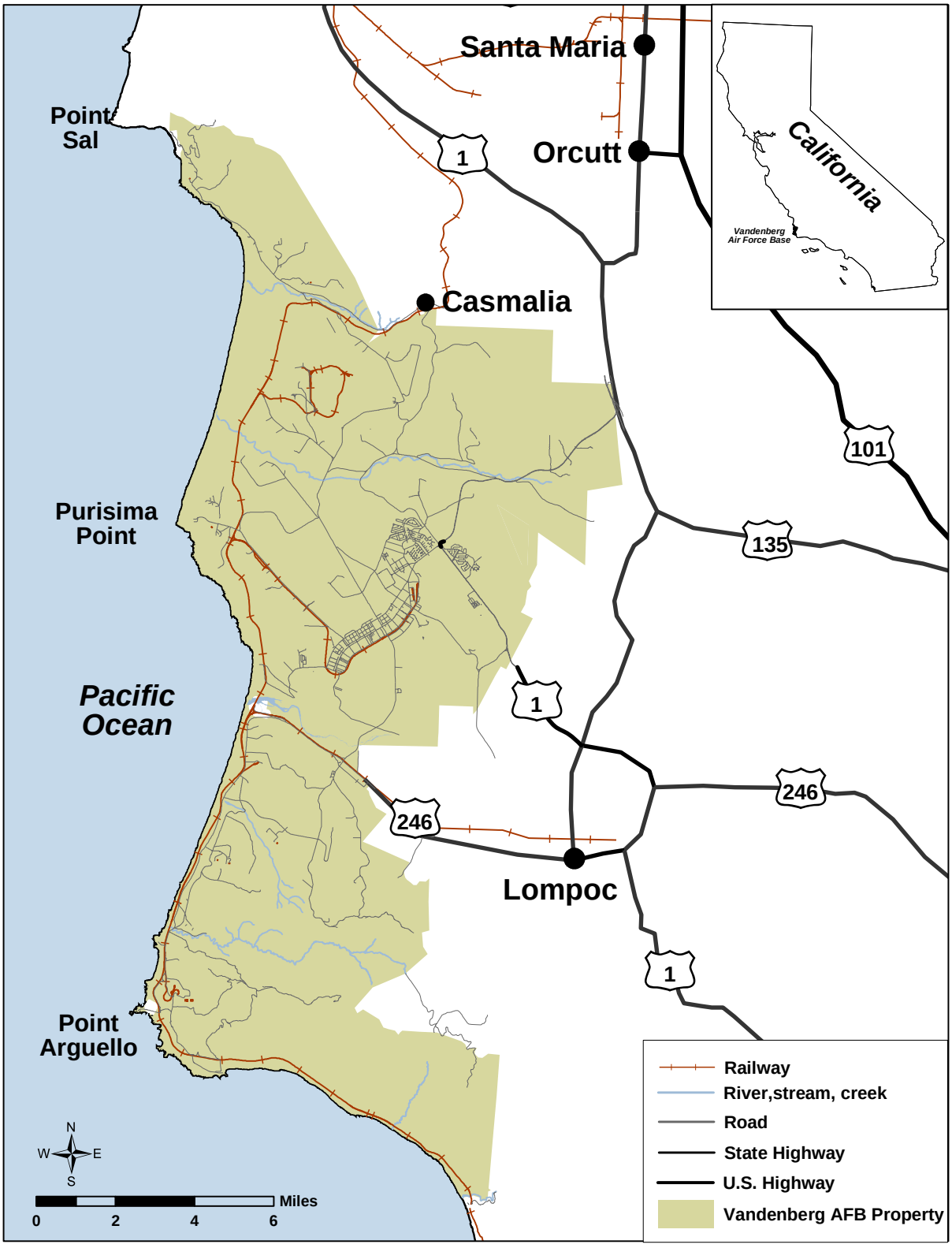

Figure 1-1. General location of Vandenberg Air Force Base.

Some of the buildings included in the Disposition List (Appendix A) have undergone initial surveys to assess the condition, materials, equipment needs, waste generation, biological conditions and cultural resources present within the building and its area of potential effect (APE) that would be affected. Analyses of potential environmental impacts for known resources in these buildings were possible during the preparation of this document. However, complete analyses of potential environmental impacts for some resources were not possible during this environmental assessment process because of the programmatic nature of this document. For example, air emissions resulting from demolition efforts and the equipment used cannot be calculated at this time because the exact number and types of equipment that will be used for each building, the length of time for deconstruction of each building and the number of personnel that will work at each building is unknown. Thus, these additional environmental reviews would be completed prior to implementing the Proposed Action for each building, through the Air Force (AF) Form 813, *Request for Environmental Impact Analysis Process*.

The Disposition List (Appendix A), includes a summary of the findings in this PEA process, and provides recommendations for supplemental environmental reviews and analyses by building, prior to implementing the Proposed Action.

The resources identified for analysis in this PEA include: air quality, biological resources; cultural resources; hazardous materials and hazardous waste management, human health and safety, land use and aesthetics, solid waste management, transportation, and water resources.

The following resources were considered but not analyzed in this PEA:

- *Earth Resources.* The Proposed Action would occur at sites already developed where prior construction has already altered the topography of the area. Furthermore, all demolition activities under the Proposed Action would occur at or above grade level. Thus, no earth resources would be affected. Any below grade filling would be done with materials from the demolition process or with borrow materials obtained from existing approved borrow areas on Vandenberg AFB.
- *Environmental Justice.* Per Executive Order (EO) 12898, *Environmental Justice*, the potential effects of the Proposed Action on minority communities and low-income communities were considered. However, because the Proposed Action would occur within Vandenberg AFB boundaries, the project would not affect low-income or minority populations within the region (i.e., Lompoc Valley and Santa Maria Valley).
- *Socioeconomics.* Implementing the Proposed Action could result in the creation of some temporary new jobs. However, these potential new jobs would have no effect on the socioeconomic environment of the region (i.e., Lompoc Valley and Santa Maria Valley). Implementing the No-Action Alternative would neither create nor eliminate jobs from the regional area.

A list of acronyms and abbreviations used in this PEA is included after the Table of Contents.

1.5. Decision to be Made

Based on the analyses completed in this PEA, the Commander, 30th Space Wing (30 SW/CC), must determine whether the selected facility management option of demolition or abandonment by any of several proposed methods for each building, would have a significant adverse effect on the quality of the human environment. A Finding of No Significant Impact (FONSI) can be attained if the 30 SW/CC determines that the Proposed Action would not result in significant adverse effects on the resources analyzed in the PEA.

1.6. Applicable Regulatory Requirements

Federal and state laws applicable to the Proposed Action and alternatives are summarized in Table 1-1 and further described in Chapters 3 and 4. Applicable Air Force regulations are summarized in Table 1-2. In addition, upon award of the contract an environmental specification section in the demolition contract would be applicable to the Proposed Action. Regulatory requirements are applicable for nine categories: air quality, biological resources, coastal resources, cultural resources, hazardous waste, human health and safety, solid waste, transportation, and water resources.

Table 1-1.
Federal and State laws applicable to the implementation of the Proposed Action.

Federal Law	Activity or Requirement
American Indian Religious Freedom Act (AIRFA) of 1978 (42 U.S. Code [USC] 1996)	The AIRFA states that the policies and procedures of Federal agencies must comply with the constitutional clause prohibiting abridgment of religious freedom—including freedom of belief, expression, and exercise—for Native Americans. The AIRFA's policy is to consider Native American access to sites, use and possession of sacred objects, and freedom to worship, and directs federal agencies to revise policies and procedures to correct conflicts with Native American religious cultural rights and practices.
Archaeological and Historic Preservation Act (AHPA) of 1974 (16 USC 469a et seq.)	The AHPA is directed toward the preservation of historic and archaeological data that would otherwise be lost as a result of federal construction or other federally licensed or assisted activities. The AHPA authorizes the Department of the Interior to undertake recovery, protection, and preservation of archaeological or historic data.
Archaeological Resources Protection Act (ARPA) of 1979 (USC 470aa-mm), Supplemental Regulations of 1984	The ARPA secures protection of archaeological resources and sites on public and Indian lands; requires permitting for any excavation or collection of archaeological material from these lands; provides civil and criminal penalties for violations.
Clean Air Act (CAA) of 1970 (42 USC 7401 et seq.)	States that applicable national ambient air quality standards must be maintained during the operation of any emission source. National Ambient Air Quality Standards include primary and secondary standards for various pollutants. The primary standards are mandated by the CAA to protect public health, while the secondary standards are intended to protect the public welfare from adverse impacts of pollution, such as visibility impairment.
Clean Air Act Amendments of 1990	Establish new federal non-attainment classifications, new emissions control requirements, and new compliance dates for areas in non-attainment. The requirements and compliance dates are based on the non-attainment classification.
Clean Water Act (CWA) of 1977 as amended (33 USC 1251 et seq.)	Prohibits the discharge of pollutants from a point source into navigable Waters of the United States, except in compliance with a National Pollutant Discharge Elimination System (NPDES) (40 CFR Part 122) permit. The navigable Waters of the United States are considered to encompass any body of water whose use, degradation, or destruction will affect interstate or foreign commerce. Section 404 of the Clean Water Act establishes a program to regulate the discharge of dredged and fill material into waters of the United States, including wetlands. Activities in waters of the United States that are regulated under this program include fills for development, water resource projects (such as dams and levees), infrastructure development (such as highways and airports), and conversion of wetlands to uplands for farming and forestry. Section 401 of the CWA requires that the discharge of dredged or fill material into water of the United States does not violate state water quality standards. Generally, no CWA Sec. 404 permits will be issued until the State has been notified and the applicant has obtained a certification of state water quality standards.
Coastal Zone Management Act (CZMA) of 1972 (16 USC 2452-24645).	The CZMA plays a significant role in water quality management. Under the CZMA, a Federal action that may affect the coastal zone must be carried out in a manner that is consistent with state coastal zone management programs.
Endangered Species Act (ESA) of 1973 (7 USC 136; 16 USC 460 et seq.)	Declares the intention of Congress to conserve threatened and endangered species and the ecosystems on which these species depend. The ESA requires that federal agencies, in consultation with the U.S. Fish and Wildlife Service (USFWS) and the National Oceanic and Atmospheric Administration Fisheries Service (NOAA Fisheries), use their authorities in furtherance of its purposes by carrying out programs for the conservation of endangered or threatened species.
Section 7 of the ESA (16 USC 1536)	Contains provisions that require federal agencies to consult with the Secretary of Interior and to take necessary actions to insure that actions authorized, funded, or carried out by them do not jeopardize the continued existence of endangered species and threatened species.
Energy Policy Act of 1992 as amended (42 USC 8256 et seq.)	The Act requires that Federal agencies significantly reduce their use of energy and reduce environmental impacts by promoting the use of energy-efficient and renewable energy technologies.

Table 1-1 *(continued)*

Federal Law	Activity or Requirement
Migratory Bird Treaty Act (MBTA) of 1918 as amended (16 USC 703-712)	The MBTA implements various treaties and conventions between the U.S. and Canada, Japan, Mexico and the former Soviet Union for the protection of migratory birds. Under the Act, taking, killing or possessing migratory birds is unlawful.
National Environmental Policy Act (NEPA) of 1969 as amended (42 USC 4321-4347)	Requires federal agencies to analyze the potential environmental impacts of major federal actions and alternatives and to use these analyses as a decision-making tool on whether and how to proceed.
National Historic Preservation Act (NHPA) of 1966 as amended (16 USC 470 et seq.)	The NHPA is the key federal law establishing the foundation and framework for historic preservation in the United States. The Act authorizes the Secretary of the Interior to expand and maintain a National Register of Historic Places (NRHP); it establishes an Advisory Council on Historic Preservation (Council) as an independent federal entity; it requires federal agencies to take into account the effects of their undertakings on historic properties, and to afford the Council an opportunity to comment upon any undertaking that may affect properties listed, or eligible for listing, in the NRHP; and it makes the heads of all federal agencies responsible for the preservation of historic properties owned or controlled by them.
Native American Graves Protection and Repatriation Act (NAGPRA) of 1990 (25 USC 3001-3013)	The NAGPRA restores certain rights to Native Americans with respect to the disposition of ancestral human remains and cultural objects; vests ownership of these materials (from federal or tribal lands) with designated Native American groups; requires notification of federal agency head when Native American cultural items are discovered on federal or tribal lands; prohibits trafficking in Native American human remains and cultural items; requires inventory and tribal notification of human remains and associated funerary objects held in existing collections by museums or federal agencies; provides for repatriation of these materials.
Noise Control Act (NCA) of 1972 (42 USC 4901 et seq.)	This Act establishes a national policy to promote an environment for all Americans free from noise that jeopardizes their health and welfare. To accomplish this, the Act establishes a means for the coordination of Federal research and activities in noise control, authorizes the establishment of Federal noise emissions standards for products distributed in commerce, and provides information to the public respecting the noise emission and noise reduction characteristics of such products. The Act authorizes and directs that Federal agencies, to the fullest extent consistent with their authority under Federal laws administered by them, carry out the programs within their control in such a manner as to further the policy declared in 42 U.S.C. 4901. Each department, agency, or instrumentality of the executive, legislative and judicial branches of the Federal Government having jurisdiction over any property or facility or engaged in any activity resulting, or which may result in, the emission of noise shall comply with Federal, State, interstate, and local requirements respecting control and abatement of environmental noise.
Pollution Prevention Act (PPA) of 1990	This Act establishes that pollution should be prevented or reduced at the source whenever feasible; pollution that cannot be prevented should be recycled in an environmentally safe manner, whenever feasible; pollution that cannot be prevented or recycled should be treated in an environmentally safe manner whenever feasible; and that disposal or other release into the environment should be employed only as a last resort and should be conducted in an environmentally safe manner.
Resource Conservation and Recovery Act (RCRA) of 1976 (42 USC 6901 et seq.)	This Act gives the Environmental Protection Agency the authority to control hazardous waste from the "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also set forth a framework for the management of non-hazardous wastes.
State Law	**Activity or Requirement**
California Coastal Act (CCA) of 1976	This Act provides long-term protection of California's 1,100-mile coastline for the benefit of current and future generations. Coastal Act policies constitute the standards used by the Coastal Commission in its coastal development permit decisions and for the review of local coastal programs prepared by local governments and submitted to the Commission for approval. These policies are also used by the Commission to review federal activities that affect the coastal zone.

Table 1-1 *(continued)*

State Law	Activity or Requirement
Clean Air Act of 1988	This Act develops and implements a program to attain the California Ambient Air Quality Standards for ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, particulate matter less than or equal to 10 microns in diameter, lead, sulfates, hydrogen sulfide, and vinyl chloride. 40 CFR Part 51 gives state and local agencies the authority to establish air quality rules and regulations. Rules adopted by the local air pollution control districts and accepted by the Air Resources Board are included in the State Implementation Plan. When approved by the U.S. Environmental Protection Agency (EPA), these rules become federally enforceable.
Porter-Cologne Water Quality Control Act	Protects all waters of the state for the use and enjoyment of the people of California and declares that the protection of water resources be administered by the regional water quality control boards.
California Integrated Waste Management Act of 1989, California Assembly Bill AB 939	Provides for the proper management and disposal of solid wastes, to include the diversion requirements for construction and demolition debris.

Table 1-2.
Air Force and Space Wing regulations applicable to the Proposed Action.

Document ID	Title	Date	Contents
AFI 32-1052	Facility Asbestos Management Program	22-Mar-1994	Establishes requirements and assigns responsibilities to incorporate facility asbestos management principles and practices into all Air Force programs. It also establishes a program to ensure compliance with 40 CFR 61.14O, National Emission Standard for Asbestos and 29 CFR 1926.58, Asbestos Construction Standards.
AFI 32-1053	Pest Management Program	1-Apr-1999	Provides guidance for pest management programs at Air Force installations. It also establishes a program to ensure compliance with Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) and 40 CFR 159-189 Pesticide Programs.
AFI 32-7020	The Environmental Restoration Program	7-Feb-2001	Provides guidance and procedures for executing the Air Force Environmental Restoration Program, referred to as the cleanup program.
AFI 32-7040	Air Quality Compliance	9-May-1994	Identifies Air Force requirements for an air quality compliance program.
AFI 32-7041	Water Quality Compliance	10-Dec-2003	Explains how to assess, attain, and sustain compliance with the Clean Water Act; other Federal, state and local environmental regulations, Final Governing Standards or the Overseas Environmental Baseline Guidance Document, applicable international agreements, and related Department of Defense and Air Force directives.
AFI 32-7042	Solid and Hazardous Waste Compliance	12-May-1994	Identifies compliance requirements for all solid and hazardous waste, except radioactive waste.
AFPAM 32-7043	Hazardous Waste Management Guide	1-Nov-1995	Provides guidance for managing hazardous waste at Air Force installations to meet Federal, state, interstate, Department of Defense, Air Force, and local environmental, worker safety, and transportation requirements.
AFI 32-7044	Storage Tank Compliance	13-Nov-2003	Identifies Air Force requirements for an aboveground and underground storage tank compliance program.

Table 1-2 *(continued)*

Document ID	Title	Date	Contents
AFI 32-7061	Environmental Impact Analysis Process	12-Mar-2003	Directs the user to the regulatory source that describes the specific tasks and procedures for successfully conducting the Air Force Environmental Impact Analysis Process.
AFI 32-7062	Air Force Base Comprehensive Planning	1-Oct-1997	Establishes the Air Force Comprehensive Planning Program for development of Air Force installations. It contains responsibilities and requirements for comprehensive planning and describes procedures for developing, implementing, and maintaining the General Plan within the installation Comprehensive Plan.
AFI 32-7064	Integrated Natural Resources Management	17-Sep-2004	Establishes framework for management of natural resources on Air Force installations in accordance with applicable federal, state, and local laws and regulations. The primary objective of Air Force natural resources programs is to sustain, restore and modernize natural, statutory and workforce infrastructure to ensure operational capability.
AFI 32-7065	Integrated Cultural Resources Management	1-Jun-2004	Directs the identification, management and maintenance of important Air Force cultural resources in a spirit of stewardship for the benefit of this and future generations of Americans. Additionally, it directs the Air Force to integrate cultural resources stewardship with the needs of its primary military mission.
AFI 32-7080	Pollution Prevention Program	12-May-1994	Directs the requirements for the Pollution Prevention Program of all Air Force installations.
AFI 32-7086	Hazardous Materials Management	1-Nov-2004	Establishes procedures and standards that govern management of hazardous materials throughout the Air Force. It applies to all Air Force personnel (at classified and unclassified operations) who authorize, procure, issue, use, or dispose of hazardous materials in the course of their official duties; and to those who manage, monitor, or track any of the preceding processes, whether the processes are performed by government or contractor personnel.
30 SWI 32-701	Conservation, Management and Enforcement	30-Oct-1998	Establishes policies, responsibilities, and procedures for the enforcement of fish and wildlife conservation, policies relative to outdoor recreational and cultural resources on Vandenberg AFB. These resources will be managed under the principles of multiple use, sustained yield, within the limitations of the military mission.
30 SWI 32-702	Environmental Management Air Emission Inventories	30-Oct-1998	Establishes policies and procedures, and defines responsibilities for air emission management at Vandenberg AFB and at other sites owned and operated by the 30 SW. It includes, but is not limited to, annual inventories of air pollution sources; record keeping and reporting of process variables, and reporting deadlines.
30 SWI 32-901	Facility Closure/Turn-In Procedures	1-Aug-2002	Describes the Facility Manager's role in closing, transferring, and turning in Air Force Real Property. It provides detailed procedures for the Facility Manager to follow to ensure the smooth transfer of Air Force real property and facilities from one organization to another or to the 30 CES for caretaker status.
30 SWP 32-1002	Lead-Based Paint Management Plan	31-Oct-2001	Presents information relevant to the implementation of a lead-based paint management program and outlines the specific actions for implementing a base-specific program.
30 SWP 32-1052A	Asbestos Management Plan (AMP)	1-Oct-2001	Establishes policies, procedures, and practices that minimize the potential exposure of building occupants and workers to asbestos fibers. It sets requirements and assigns responsibilities to incorporate facility asbestos management principles in accordance with Air Force Instruction 32-1052, *Facility Asbestos Management*.
30 SWP 32-1052B	Asbestos Operating Plan (AOP)	1-Oct-2001	Provides guidance on all aspects of the asbestos management program at Vandenberg AFB. The AOP and the AMP establish a framework for preventing asbestos exposure to facility occupants and maintenance personnel.

Table 1-2 *(continued)*

Document ID	Title	Date	Contents
30 SWP 32-1067	Water Quality Management Plan (WQMP)	31-Aug-2000	Primary document for the management of the drinking water system. The WQMP references federal, state, local, and Air Force documents that establish mandatory compliance requirements.
30 SWP 32-4002A	Hazardous Materials Emergency Response Plan	2-Sep-2002	Provides guidance for response to an accidental or unauthorized release of hazardous materials. The plan is designed to protect personnel, property and the environment. It provides guidance, policy and protocols necessary to initiate, conduct, and terminate an emergency response. The plan fulfills federal and state requirements for an emergency response plan.
30 SWP 32-4002C	Spill Prevention, Control, and Countermeasures Plan	15-Aug-2004	Describes the policies and procedures that will be implemented at Vandenberg AFB to prevent the discharge of harmful quantities of oil-in any kind or form-into the navigable waters of the United States. This plan was prepared in accordance with 40 CFR 112, *Oil Pollution Prevention*.
30 SWP 32-7041A	Wastewater Management Plan	31-Aug-2000	Provides guidance for managing wastewater control activities, the background and regulatory framework for wastewater activities, description of wastewater facilities and their activities, and wastewater discharge control practices.
30 SWP 32-7041B	Storm Water Management Plan	21-Aug-2000	Provides direction for managing industrial storm water pollution prevention activities on Vandenberg AFB. The plan may direct Vandenberg AFB management requirements that are more stringent than regulations.
30 SWP 32-7042	Solid Waste Management Plan	30-Jun-2000	Establishes requirements and waste reduction goals specified by the California Integrated Waste Management Act of 1989. The plan provides the program framework, how Pollution Prevention goals are to be achieved, and guidance so that the Vandenberg AFB Landfill operates in accordance with the Joint Technical Document (permit).
30 SWP 32-7043A	Hazardous Waste Management Plan (HWMP)	15-Apr-2002	Establishes requirements for managing hazardous waste activities on Vandenberg AFB. The HWMP references federal, state, and local requirements that establish definitive compliance requirements. The HWMP may direct Vandenberg AFB management requirements that are more stringent than regulations.
30 SWP 32-7043E	Recoverable and Waste Petroleum Management Plan (RWMP)	6-Apr-2001	Provides guidelines for collecting, segregating, and processing recoverable and waste petroleum products. It references federal, state, local and Air Force documents that establish the mandatory compliance requirements. The RWMP may direct 30 SW management practices that are more stringent than the regulations. The RWMP is intended to assist operators, technicians, and managers in meeting 30 SW Pollution Prevention (P2) goals.
30 SWP 32-7086	Hazardous Materials Management Plan (HMMP)	25-Feb-2005	Provides direction for managing hazardous materials (HAZMAT) activities on Vandenberg AFB. This plan may direct Vandenberg AFB management requirements that are more stringent than regulations. The HMMP is intended to assist HAZMAT users, managers, and technicians in meeting regulatory requirements.
30SWP 32-7080	Pollution Prevention Management Plan	6-May-1996	Revision on hold pending update of AF guidance (AFI) on pollution prevention.
	Integrated Cultural Resources Management Plan	Dec-2003 (Draft)	Compliance and management plans to assist the installation commander's decision on cultural resources management actions and for specific cultural resources compliance and procedures.
	Integrated Natural Resources Management Plan	Feb-2003 (Draft)	Directs an adaptive management approach to natural resources issues on Vandenberg AFB.
	Vandenberg Air Force Base General Plan	Jan-2004	Identifies essential characteristics and capabilities of the installation and assesses potentials for development.

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Chapter 2. Description of the Proposed Action and Alternatives

This chapter describes the Proposed Action, the No-Action Alternative, and other identified Alternatives. The chapter includes detailed descriptions of equipment needs, demolition requirements, and operational constraints for the Proposed Action and feasible alternatives. Background information documenting the parameters for the deconstruction and demolition of Atlas and Titan Heritage launch program facilities was provided in the Multiple Structures Removal Action Work Plan (Jacobs, 2004), which is incorporated by reference.

Acronyms and definitions of terms widely used in this PEA are included in pages iv through ix, following the Table of Contents. It is recommended that the reader review these definitions to ensure understanding of the concepts presented and discussed in this PEA.

2.1. Alternative A: Proposed Action

Under the Proposed Action, Atlas and Titan Heritage launch program buildings no longer required to sustain either current or foreseeable Vandenberg AFB missions, and which are returned to 30 CES/CECBR, would be demolished or abandoned. Buildings classified for demolition or abandonment are located throughout Vandenberg AFB (Figures 2-1A and 2-1B). Twenty-eight (28) buildings are located on North Vandenberg AFB, and 35 buildings are located on South Vandenberg AFB.

2.1.1. Methods of Implementation

The Proposed Action would entail the total above grade demolition, complete abandonment, or partial demolition and partial abandonment of specific structures at each of the buildings included in the Disposition List (Appendix A). The degree to which a building is demolished to above grade and then abandoned depends on the type of building and would be determined at the time of implementing the Proposed Action. Demolition and abandonment would entail various actions as described in the following sections.

2.1.1.1. Demolition

Buildings proposed for demolition (Appendix A), cover a broad range of structural types with varying composition of materials, complexity of building structures, and variety of construction methods. While most buildings are constructed of concrete and structural steel, some have attached siding or cladding, and others have block and mortar or poured walls. The method selected for building demolition and debris management would differ for each building and would be selected to optimize reuse and recycle opportunities.

The demolition method(s) selected for each building would depend on cost effectiveness and environmental constraints identified within the project boundaries of each building. Environmental constraints include hazardous materials, biological resources, and cultural resources.

All buildings would be demolished to grade level. Subsurface structures and underground utilities would be capped or secured at ground level and abandoned in-place.

Demolition debris would be segregated to maximize reuse and recycling while minimizing disposal in the Vandenberg AFB landfill. The proposed demolition methods would make use of systematic dismantling, commonly referred to as deconstruction, and coordinated efforts to reuse and recycle any applicable materials. Regulatory compliant disposal would be considered the last option for management of the debris.

Demolition under the Proposed Action would include these general, programmatic actions:

- Pre-demolition biological, cultural, and environmental surveys, which would result in

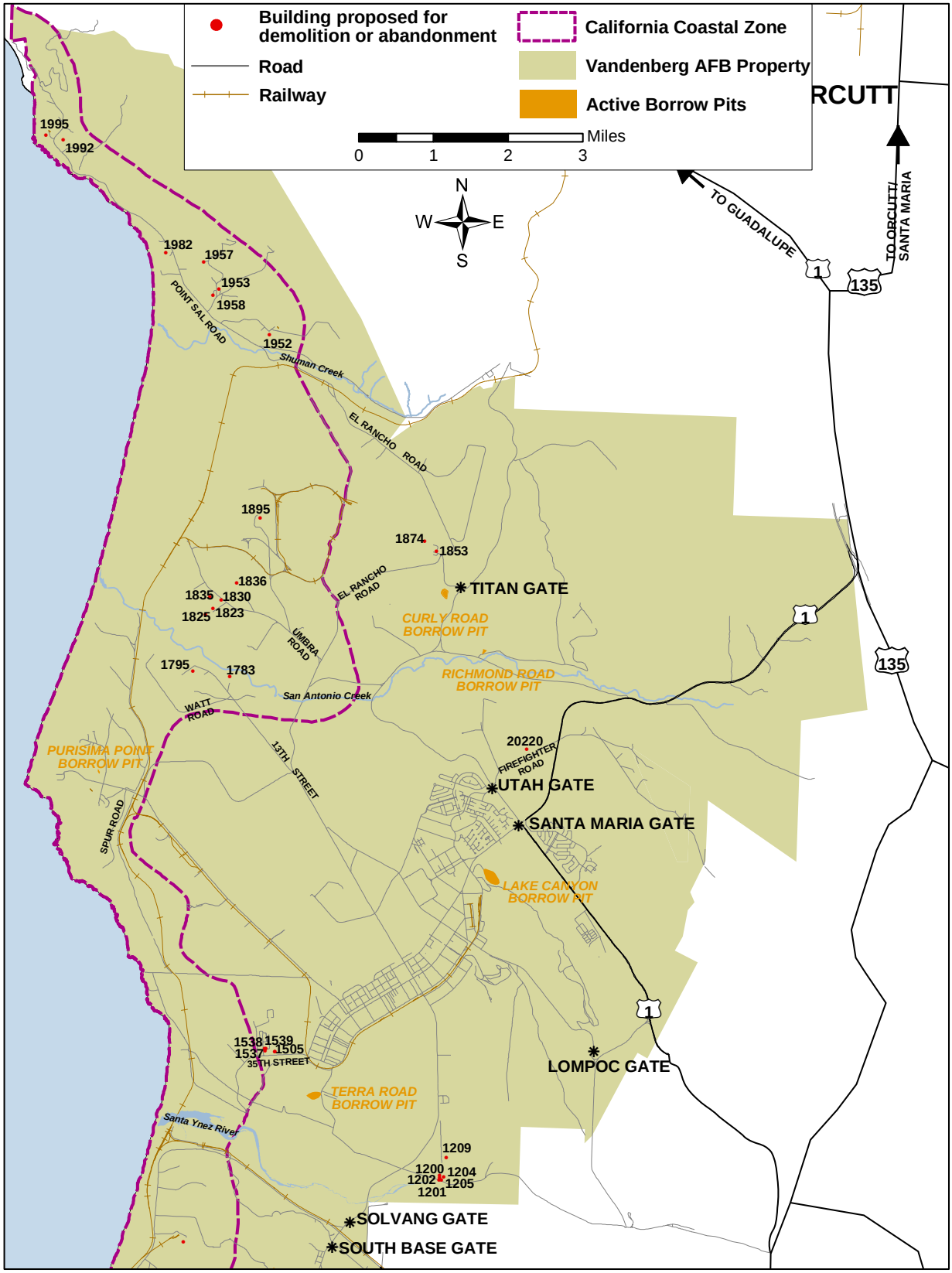

Figure 2-1A. Buildings proposed for demolition or abandonment on North Vandenberg AFB.

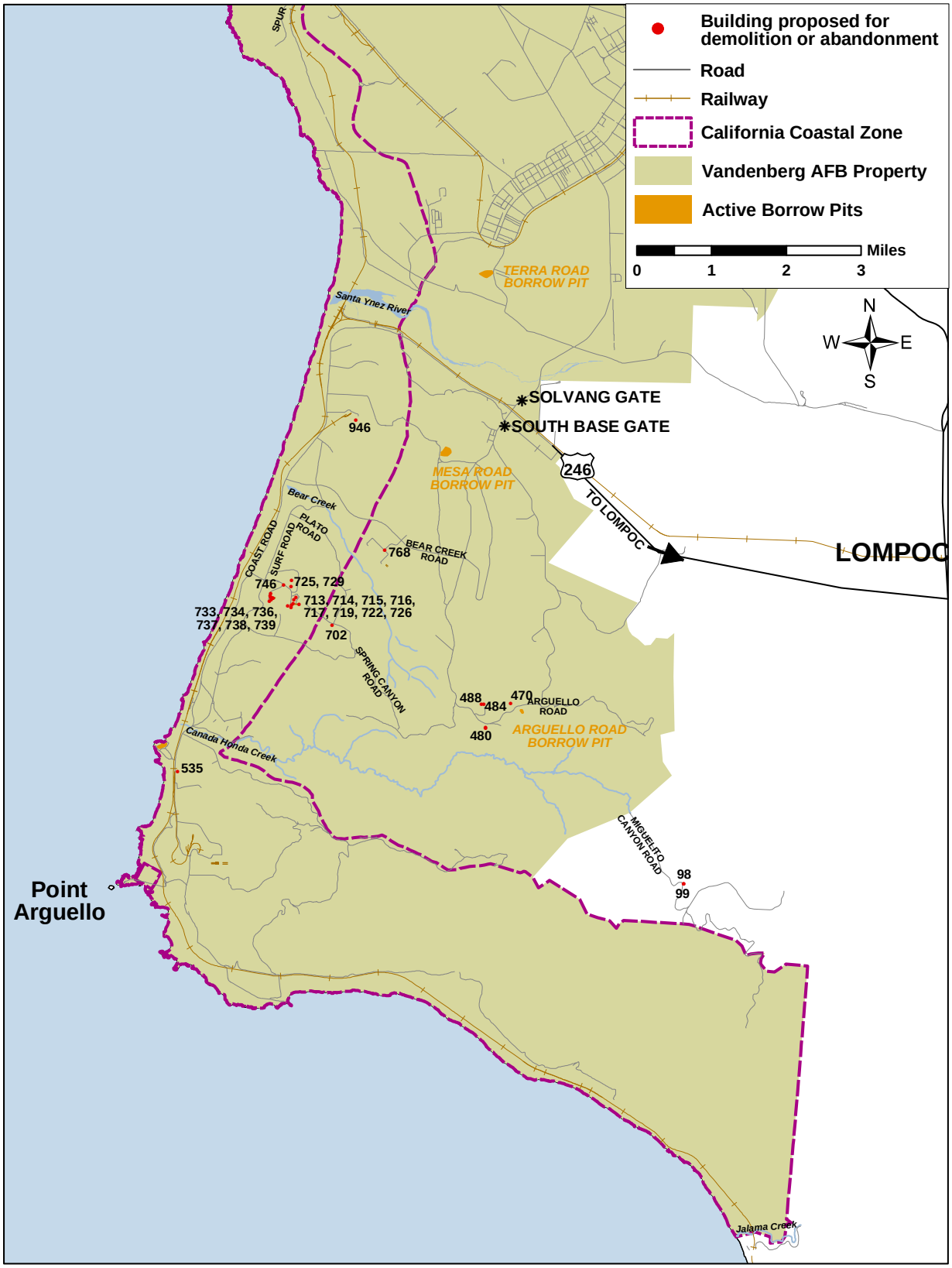

Figure 2-1B. Buildings proposed for demolition or abandonment on South Vandenberg AFB.

approval to proceed, conditional approval to proceed, or delay of approval to proceed.

- Abatement and proper management of Asbestos Containing Material (ACM), lead-based paints (LBP), or other human or environmental hazards.
- Deconstruction to facilitate the removal and management of select items and to prepare the building for above grade structural demolition.
- Demolition of the building and above grade structural components.
- Demolition debris management. This would entail the removal and segregation for subsequent reuse, recycling or disposal of all building materials, including improvements and utilities (i.e., mechanical, electrical, plumbing, lighting, furnishings, equipment, and fencing) associated with each building.
- Site restoration to grade level, which would include infilling with inert demolition debris and appropriate fill material taken from existing Vandenberg AFB borrow pits (Figures 2-1A and 2-1B), as required.
- Hydro-seeding (with a seed mixture pre-approved by the 30th Environmental Flight [30 CES/CEV]) to minimize the potential for erosion and runoff.

Concrete Deconstruction and Demolition

For the above grade concrete portions of the buildings, the Proposed Action would remove the concrete, segregate the steel rebar and concrete, with the steel being recycled, and the concrete being crushed and used as engineered fill, road base, or as aggregate for new concrete. Concrete in the buildings must first be broken into manageable sizes for crushing by equipment designed for this purpose. Concrete below grade would be abandoned in-place. To accomplish the primary break-up of concrete, the following methods are proposed:

- Cutting – use of concrete cutting saw.
- Stinger – hydraulic attachment for excavators and backhoes that breaks the concrete.
- Jack Hammers – air driven or electrical powered jackhammers.
- Wrecking Ball – impact force of mechanical weight to fracture concrete.
- Manual – use of sledgehammers.
- Explosives – fracture concrete by means of overpressure.

Steel Deconstruction and Demolition

The steel portions of buildings would be cut into manageable pieces and sent to smelters for recycling. To safely and efficiently manage steel structures, they must be easily accessible, i.e., the ideal handling location for steel structures being on the ground. The following methods are proposed for bringing metal structures down to ground level:

- Explosion – weaken selected structural members and use explosives to remove last supporting members and cause a directed, controlled dropping of the building. Use of this method would require a specialized explosive demolition contractor with blaster's permit, license, and bonding. An Explosive Demolition Plan would be developed by the contractor and submitted to 30th Space Wing Safety (30 SW/SE) for approval prior to start of activities.
- Felling – weaken selected structural members and use cables to cause a directed controlled dropping of the building. The preferred demolition process of buildings using this method would be the selective cutting and weakening of designated structural members to induce structural failure when guide wires are used to pull the structure down.
- Systematic Disassembly – use of cranes and other devices to lower components or subassemblies to the ground.
- Cutting – by means of mechanicals shears or saws, or by electrical or flame torches.

2.1.1.2. Abandonment

Abandonment of buildings under the Proposed Action would entail ensuring these buildings are safe and secured against accidental intrusion by humans and wildlife to prevent endangering human health and safety and entrapment of wildlife. Under the Proposed Action, demolition as described in this PEA may occur for only a portion of the building, with the remainder being abandoned in-place. Upon completion of the demolition portion of the Proposed Action in a specific building, 30 CES/CECBR and the demolition contractor

would implement 30 SWI 32-901, *Facility Closure/ Turn-In Procedures*, to ensure those remaining portions of the building are in a condition suitable for abandonment.

2.1.2. Equipment Usage

Equipment needs for deconstruction, demolition, and abandonment would vary by type of building and demolition methods selected for each building. The list included in Table 2-1 is intended to provide a general guide of the types of equipment expected to be used for these processes. This list is not all-inclusive and the number of each type of equipment required for each of the buildings would depend on the structures of the buildings. The 30th Civil Engineer Contracts Office (30 CES/CEC) and the demolition contractor would provide a final list of equipment to 30 CES/CEV upon submission of the individual AF Form 813, *Request for Environmental Impact Analysis*.

2.1.3. Project Associated Traffic

Removal of demolition waste materials from each building and its transportation to the Vandenberg AFB landfill, or other assigned location, would be accomplished along existing dirt, gravel, and paved access roads and roadways. New access or transportation roads or modifications to existing access or transportation roads would not be required. A pre-established transportation route would be designated for each facility and the contractor would restrict vehicular traffic to the assigned route. In addition, access of contractors to controlled access areas, i.e., Space Launch Complex (SLC) 4E, would be restricted and possible only after Vandenberg AFB issues a clearance for that access.

2.1.4. Disposal of Waste Materials

Non-friable asbestos and acceptable debris would be transported to the Vandenberg AFB landfill. Vandenberg AFB would implement the diversion standard set by Santa Barbara County at the time the demolition actions take place.

30 CES/CEV will require a minimum 85 percent diversion rate by weight over all for C&D materials generated by these efforts. Inert materials are highly recyclable with proper pre-planning for segregation and on-site management. Steel, non-chemically treated wood, concrete, waste soil, and asphalt generated as a result of the demolition actions would be expected to have a diversion rate higher than 85 percent. Typically, such materials are 100 percent divertible with proper planning and practices. Vandenberg AFB policy is that C&D materials will be managed on Vandenberg AFB to the maximum extent possible. Efforts to minimize capacity consumption of off-base Santa Barbara County recyclers will be incorporated into all project planning. No off-base disposal of solid waste within Santa Barbara County is authorized for these demolition efforts.

2.1.5. Time Required for Completion

The time required for accomplishing the deconstruction, demolition, and/or abandonment of each building under the Proposed Action would

Table 2-1.
Types of powered equipment that would be used during implementation of the Proposed Action.

Cutting torches (electrical and flame)	Machine saw
Hammer drill	Negative air machine with HEPA filters
Haul trucks	Dump trailers
Hydraulic shears	Bulldozer
Wrecking ball	Excavators
Compaction roller	Water trucks
Lift crane	Fork lift
Dumpster container	Impact crusher vehicle (up to 200 tons per hour)
Front-end loaders	Whacker plate (fill compaction)
Abrasive blasters	Portable generators

depend on the size and type of each building, the structures within each building that are included in the action, the types and methods selected for implementing the action, and any environmental constraints. This time could be as short as seven to 10 days or as long 160 days. In addition, the time of year when the Proposed Action would be implemented may also influence the length of the project as a result of constraints resulting from the presence of sensitive biological resources. 30 CES/CEC and the demolition contractor would provide an estimated time for project length to 30 CES/CEV upon submission of the individual AF Form 813, *Request for Environmental Impact Analysis*.

2.1.6. Project Personnel

The number of personnel required to implement the Proposed Action at each of the buildings listed in the Disposition List (Appendix A) would be dependent on the size and type of each building, the extent of demolition and/or abandonment, and the methods of implementation selected for each building. 30 CES/CEC and the demolition contractor would provide an estimated time for project length and number of personnel to 30 CES/CEV upon submission of the individual AF Form 813.

2.1.7. Potential Environmental Issues

Installation Restoration Program (IRP) monitoring wells are present at many sites on Vandenberg AFB. The schedule for deconstruction and demolition activities must be coordinated with the 30 CES/CEV IRP Section (30 CES/CEVR).

Environmentally sensitive areas are present at many sites on Vandenberg AFB. Contractor personnel, vehicles and equipment would be prohibited from entering these areas. All deconstruction and demolition activities must be coordinated through 30 CES/CEV Planning Section (30 CES/CEVP) prior to initiation of any activities.

Wildlife species, i.e., birds and bats, may occupy some presently unused or abandoned buildings. To prevent their entrapment, these animals would have to be vacated from the buildings prior to demolition or safe abandonment of the building. In addition, special status plant and wildlife species may be present at some of the buildings or within their APE.

Several buildings at various facilities are known to contain or are suspected of containing ACM, polychlorinated biphenyl (PCB) (present in oils, coatings, and electrical devices), dioxins, mercury switches, and LBP. If not already completed, pre-demolition surveys to document the presence of these materials would be required, and abatement would follow as required, prior to initiation of any demolition activities.

2.2. Alternative B: No-Action Alternative

Under the No-Action Alternative, no Atlas and Titan Heritage launch program buildings would be demolished. 30 CES/CECBR would abandon buildings in-place, once current facility occupants accomplished facility closure and turn-in procedures per 30 SWI 32-901, *Facility Closure/Turn-In Procedures*.

2.3. Alternatives Eliminated from Further Consideration

The alternatives discussed in this section were considered but eliminated from further analyses for the reasons provided below.

2.3.1. Transfer of Facilities

This alternative would transfer eligible facilities to another user. Buildings included in the Disposition List (Appendix A) were either not eligible for transfer due to their present state or no users were identified for any of the eligible facilities. Therefore, this alternative was eliminated from further consideration.

2.3.2. Maintenance of Facilities

This alternative would entail the maintenance of buildings until a new user is found. As a routine part of base operations, facilities that are eligible for transfer to new users in the near future are maintained, on a funding availability basis, until the transfer occurs. However, this alternative was eliminated from further consideration for several reasons: (1) funding would not be available for the maintenance of buildings included in the Disposition List (Appendix

A); (2) no new users were identified for any of these buildings, thus they were placed on a proposed demolition list; and (3) buildings identified as essential for infrastructure support would continue to be maintained as they are at the present time, and were not included on the proposed demolition list.

2.4. Environmental Protection and Monitoring Measures

Through implementing the management measures outlined below, potentially adverse project impacts to resources should be avoided or insignificant.

2.4.1. Air Quality

Programmatic Measures

- 30 CES/CEC would submit an AF Form 813, *Request for Environmental Impact Analysis* to 30 CES/CEV, prior to the start of any demolition or abandonment action at all sites, indicating the preferred method of demolition or abandonment for the building(s) along with a detailed equipment list.
- 30 CES/CEV would estimate the air emissions based upon the methodology detailed in Appendix D (Air Quality Analysis), and maintain a calendar year and a 12-month rolling air inventory.
- Environmental clearances would not be given if the specific project emissions plus the cumulative calendar-year emissions of carbon monoxide (CO), nitrogen oxides (NO_x), particulate matter 10 microns or less in diameter (PM_{10}), or reactive organic compounds (ROCs) exceed 100 tons/year.

Project Specific Measures

- Apply water – preferably reclaimed - at least twice daily to dirt roads, graded areas, and dirt stockpiles to prevent excessive dust at the staging areas. Increase watering frequency whenever the wind speed exceeds 15 miles per hour. Chlorinated water would not be allowed to run into any waterway.
- Minimize vehicle speeds on exposed earth.
- After completion of project activities, treat disturbed soil by watering, revegetating, or spreading soil binders to prevent wind erosion of the soil.
- Limit ground disturbance to the smallest, practical area and to the least amount of time.
- Designate personnel to monitor project activities to ensure that excessive dust is not generated at demolition sites.
- Comply with the Storm Water Pollution Prevention Plan (SWPPP) – including Best Management Practices (BMPs) to reduce dust emissions – and contractor's Environmental Protection Plan (EPP), which includes dust control compliance measures.
- If importation, exportation, and stockpiling of fill material are involved, soil stockpiled for more than two days shall be covered, kept moist, or treated with soil binders to prevent dust generation. Trucks transporting fill material to and from the site shall be tarped from the point of origin.
- When feasible, use equipment powered with federally mandated "clean" diesel engines.
- Minimize the size of the engine in equipment used for the project.
- Manage the use of equipment to minimize the number of pieces of equipment operating simultaneously and total operation time for the project.
- Maintain engines in tune per manufacturer or operator's specification.
- Use California Air Resources Board (CARB) certified low diesel fuel.
- If feasible, install Environmental Protection Agency (EPA) or CARB certified diesel catalytic converters, diesel oxidation catalysts, and diesel particulate filters.
- Follow CARB developed idling regulations for trucks during loading and unloading
- If feasible, replace diesel equipment with electrical equipment.

2.4.2. Biological Resources

Programmatic Measures

- Demolition plans for structures with documented birds and bats would either (a) schedule demolition outside the breeding season for the species identified within the specific structures or (b) identify specific

exclusion measures as part of the facility demolition plan to be implemented *prior to the beginning of the breeding season* when the demolition would occur.

- 30 CES/CEC would submit an AF Form 813, *Request for Environmental Impact Analysis* to 30 CES/CEV, at least four months prior to the start of the project at any of the buildings identified as bat habitat in Table 4-1 and Appendix B of this PEA, to provide the opportunity to exclude bats that may inhabit the buildings.

Project Specific Measures

- Access to all buildings would be through existing dirt, gravel, and paved access roads and roadways.
- Demolition and abandonment activities would be restricted to the immediate area surrounding each of the buildings and would not extend beyond a 30-foot radius at each building site.
- All sites would be hydro-seeded with a mixture pre-approved by 30 CES/CEV to minimize potential for erosion and runoff.
- To minimize disturbances to Burton Mesa Chaparral near Buildings 470, 480, 484, 488, and 1505, where feasible, demolition equipment and methods that minimize disturbance to areas outside the building footprint would be used. Where vegetation must be disturbed, drive over, crush or cut, rather than excavation, would provide the opportunity for root systems to remain intact and the vegetation to resprout.
- If permanent impacts cannot be avoided to Burton Mesa Chaparral, the Air Force would evaluate those actual impacts and develop and implement a restoration plan.
- If demolition occurs during avian breeding season (mid-January through August), a qualified biologist would complete surveys to document the presence of active nests in the vicinity of the project sites immediately prior to the start of the project. If nests were found within the vicinity of the project area, project activities would be monitored to identify any potential disturbance so measures could be implemented to avoid adverse effects.
- If nests of bird species protected under the Migratory Bird Treaty Act (MBTA) were found within vegetation that would be removed during project implementation, no clearing would occur until the eggs are hatched and the young are fledged.

2.4.3. Cultural Resources

Project Specific Measures

- A qualified archaeologist and Native American would monitor all activities associated with the Proposed Action at the following sites:
  - SLC-4 (Buildings 713, 714, 715, 716, 717, 719, 722, 725, 726, 729, 733, 734, 736, 737, 738, 739, and 746).
  - RF Hut 3 (Building 1982).
  - RF Hut 7 (Building 1958).
  - RF Hut 9 (Building 1992).
- At RF Hut 3 (Building 1982), RF Hut 7 (Building 1958), and RF Hut 9 (Building 1992), only rubber-tired vehicles and equipment would be used during demolition. Vehicles and motorized equipment would be restricted to the existing gravel roads and to the graveled area surrounding the hut.
- Prior to the start of any project activities at Buildings 1836 qualified archaeologists and a Native American would direct and assist in the installation of protective fencing along the eastern edge of Tod Road to ensure that vehicles and pedestrians stay on the road for the duration of the demolition work. The fencing would extend from the security fence south for 70 meters and no more than three meters from the edge of the pavement. This fencing would remain in place throughout the duration of the project at this site.

2.4.4. Hazardous Materials and Hazardous Waste Management

Programmatic Measures

- The demolition contractor would implement all hazardous materials and waste management procedures, as outlined in the 30 SWP 32-7086, *Hazardous Materials Management Plan*; the 30 SWP 32-7043A, *Hazardous Waste Management Plan*; the 30 SWP 32-7042, *Solid Waste Management Plan*; the 30 SWP 32-1052A, *Asbestos Management Plan*; and the 30 SWP 32-1002, *Lead-Based Paint Management Plan*.

- In compliance with California Business Plan requirements, the contractor would submit a Business Plan or Disclaimer based upon amount of hazardous materials present on site for more than 30 days.
- Per Vandenberg AFB requirements the contractor would submit an EPP to 30 CES/CEV prior to the start of demolition activities.
- 30 CES/CEC would require the demolition contractor to submit a Spill Prevention and Response Plan prior to the start of demolition activities at any of the building sites identified in the Demolition List (Appendix A), and would obtain concurrence from 30 CES/CEV.
- Proper disposal of hazardous waste would be accomplished through identification, characterization, sampling and analysis of wastes generated.
- To avoid accidental exposure and ensure proper management of hazardous materials presently managed in-place (ACM, LBP, PCBs and dioxins), hazardous materials surveys and abatements would be accomplished prior to deconstruction and demolition. All personnel performing surveys, abatements and demolition activities would be trained to recognize hazards and protect themselves and others from exposure.
- The explosive demolition contractor would develop and provide 30 CES with an approved explosive demolition plan.
- An Asbestos Work Plan would be prepared by the demolition contractor and approved by 30 CES/CEVC for all sites identified in the Disposition List (Appendix A). All ACM would be abated prior to demolition.
- The removal of any transformers would be coordinated with the 30 CES Utilities Electrical Shop.
- All demolition actions at sites identified in the Disposition List (Appendix A) would be coordinated with the 30 CES/CEV Installation Restoration Program (IRP) to avoid interference with IRP actions, damage to equipment or monitoring wells, and exposure of workers to contamination.

Project Specific Measures

- All hazardous materials would be properly identified and used in accordance with manufacturer's specifications to avoid accidental exposure to or release of hazardous materials required to operate and maintain demolition equipment.
- Only the needed amount of explosives required to accomplish explosive demolition of specific buildings would be brought to the project site.
- All equipment would be properly maintained and free of leaks during operation. All necessary equipment maintenance and repairs would be performed in predesignated controlled, paved areas to minimize risks from accidental spillage or release.
- All demolition actions would be coordinated with the 30 CES/CEVR so as not to interfere with IRP actions, damage IRP equipment or monitoring wells, or expose workers to contamination.
- All personnel working at abatement sites would wear protective clothing and equipment to protect against hazards that may be encountered.

2.4.5. Human Health and Safety

Programmatic Measures

- To protect workers from hazards associated with potential unexploded ordnance (UXO), all project activities would be coordinated with the 30 SW Explosive Ordnance Disposal (EOD) prior to implementation.
- The contractor will prepare an explosives demolition plan and obtain approval from 30 SW/SE.

Project Specific Measures

- All personnel working at hazardous materials abatement sites would wear protective clothing and equipment to protect against hazards that may be encountered.

2.4.6. Land Use and Aesthetics

Programmatic Measures

- Some of the buildings proposed for demolition and abandonment under the Proposed Action are located within the California Coastal Zone (see Table 3-7. Vandenberg AFB would address the Proposed Action with Commission staff and, if appropriate, request California

Coastal Commission concurrence with a Negative Determination.

2.4.7. Solid Waste Management

Programmatic Measures

- Using inert debris as engineered fill in the below grade voids that would otherwise remain unfilled or require additional fill to be trucked-in from base borrow pits, would minimize the amount of inert debris requiring disposal. Inert debris engineered fill operations must be approved by Santa Barbara County Environmental Services and conducted in accordance with CCR Title 14 Div 7 17288.3, *Inert Debris Engineered Fill Operations*.
- Hazardous materials surveys and appropriate abatement actions would be completed prior to structural demolition to avoid contamination of inert demolition debris.
- Solid waste disposal would be minimized by:
  - Removing salvageable, reusable, or recyclable materials, items and equipment prior to structural demolition.
  - Segregating and separately managing the different types of waste during the deconstruction and demolition processes.
  - Segregating and processing the different types of demolition debris into sizes, characteristics and specifications identified by local recyclers as acceptable to their authorized processes.
  - Segregating and processing the different types of demolition debris into sizes, characteristics and specifications for reuse within other Vandenberg AFB projects.
  - Using segregated demolition debris, such as residual wood, drywall, roofing, and flooring, as feedstock for grinding to make demolition debris suitable for use as alternate daily cover at the Base Landfill.

2.4.8. Transportation

Programmatic Measures

- Encourage project employees to carpool and eat lunch on-site.
- Schedule truck trips during non-peak traffic hours.
- Reduce truck trips by crushing concrete and using as engineered fill on-site instead of shipping the concrete for processing and hauling fill from other locations on Vandenberg AFB.
- Phase demolition activities so concrete can be taken directly from sites not requiring engineered fill to sites that would require engineered fill instead of stockpiling the fill at a central location.
- Phase demolition activities so recyclable materials can be consolidated into full loads of materials ready for shipment to the recycler.
- If feasible, borrow pits located on the same section of the base (North Vandenberg AFB vs. South Vandenberg AFB) would be used for sites requiring fill to reduce impacts to off-base roads.

2.4.9. Water Resources

Programmatic Measures

- The proposed project would require a National Pollutant Discharge Elimination System (NPDES) Permit because the total disturbed area would be greater than one acre.
- The demolition contractor would develop and implement a SWPPP to maintain compliance with the NPDES Permit.
- The demolition contractor would implement all NPDES Permit conditions and BMPs to minimize the potential for adverse impacts to local water resources.
- A Notice of Intent would be coordinated with the 30 CES/CEV and a Notice of Termination would be submitted to the Central Coast Regional Water Quality Control Board (RWQCB) after coordination with 30 CES/CEV to ensure all permit termination requirements are met.

Chapter 3. Affected Environment

3.1. Air Quality

Air quality is described based upon the concentration of pollutants in the atmosphere. These concentrations are expressed in units of parts per million (ppm) or micrograms per cubic meter ($\mu g/m^3$). The type and amount of pollutants emitted into the atmosphere, together with the size and topography of the air basin and the prevailing meteorological conditions, determine air quality. Comparing the concentration to state and federal ambient air quality standards determine the significance of any particular pollutant concentration. These standards represent the maximum allowable atmospheric concentrations that may occur while still providing protection for public health and safety with a reasonable margin of safety.

The Clean Air Act (CAA) required the United States Environmental Protection Agency (U.S. EPA) to establish ambient ceilings for certain criteria pollutants. Subsequently, the U.S. EPA promulgated regulations that set the National Ambient Air Quality Standards (NAAQS). NAAQS have been established for CO, lead (Pb), nitrogen dioxide (NO_2), ozone (O_3), PM_{10}, particulate matter 2.5 microns or less in diameter ($PM_{2.5}$), and sulfur dioxide (SO_2). Of these criteria pollutants, only O_3 is a secondary pollutant – i.e., it is not directly emitted, but is formed from the reaction of NO_X and ROCs. The NAAQS are presented in Table 3-1.

Under the California CAA, California established air quality standards for the state, known as the California Ambient Air Quality Standards (CAAQS). CAAQS are generally more stringent than the NAAQS and there are additional CAAQS for sulfates (SO_4), hydrogen sulfide (H_2S), vinyl chloride, and visibility-reducing particulate matter. The CAAQS are also presented in Table 3-1.

The area affected by the emissions from the Proposed Action includes Vandenberg AFB and the surrounding portions of northern Santa Barbara County. For CO, NO_2, PM_{10}, and SO_2, the affected area is generally limited to a few miles downwind of the emission source, while for O_3 it can extend many miles downwind. Because the reaction between ROCs and NO_Xs usually occurs several hours after they are emitted, the maximum O_3 level can be many miles from the source; therefore, the area affected by O_3 and its precursors produced by Vandenberg AFB, could include most of northern Santa Barbara County. In addition, O_3 and its precursors transported from other regions can combine with local emissions to produce high, local O_3 concentrations.

3.1.1. Regional Climate and Meteorology

The climate at Vandenberg AFB can be characterized as cool and wet from November through April and warm and dry from May through October. The average annual rainfall is approximately 14.7 inches, most of which falls between November and May (unpub. data, 30 SW). Winds are usually light during the nighttime hours, reaching moderate speeds of approximately 12 miles per hour by the afternoon. Winds are most often northwesterly on North Vandenberg AFB and north to northeasterly on South Vandenberg AFB. The strongest winds are associated with rainy season storms.

Vandenberg AFB is subject to early morning and afternoon temperature inversions about 96 and 87 percent (%) of the time, respectively. In an inversion, air temperature rises with increasing altitude, which confines the surface air and prevents it from rising (USAF 2003). This restricts the vertical dispersion of pollutants and, therefore, increases local pollutant concentrations. Pollutants are "trapped" under an inversion layer until either solar radiation produces enough heat to lift the layer or strong surface winds disperse the pollutants. In general, these conditions occur most frequently during the nighttime and early morning hours.

Table 3-1.
Ambient air quality standards.

Pollutant	Averaging Time	CAAQS[1,3]	NAAQS[2,3]	
			Primary[4]	Secondary[5]
Ozone	8-hour	0.070 ppm [6] (137 μg/m^3)	0.08 ppm (157 μg/m^3)	same as primary
	1-hour	0.09 ppm (180 μg/m^3)	0.12 ppm [7] (235 μg/m^3)	
Carbon Monoxide	8-hour	9 ppm (10,000 μg/m^3)	9 ppm (10,000 μg/m^3)	--
	1-hour	20 ppm (23,000 μg/m^3)	35 ppm (40,000 μg/m^3)	--
Nitrogen Dioxide	annual average	--	0.053 ppm (100 μg/m^3) (arith mean)	same as primary
	1-hour	0.25 ppm (470 μg/m^3)	--	--
Sulfur Dioxide	annual average	--	0.03 ppm (80 μg/m^3)	--
	24-hour	0.04 ppm (105 μg/m^3)	0.14 ppm (365 μg/m^3)	--
	3-hour	--	--	0.5 ppm (1300 μg/m^3)
	1-hour	0.25 ppm (655 μg/m^3)	--	--
PM_{10}	annual mean (arith or geo)	20 μg/m^3 (geo mean)	50 μg/m^3 (arith mean)	same as primary
	24-hour	50 μg/m^3	150 μg/m^3	same as primary
$PM_{2.5}$	annual arith mean	12 μg/m^3	15 μg/m^3	same as primary
	24-hour	--	65 μg/m^3	same as primary
Sulfates	24-hour	25 μg/m^3	--	--
Lead	30-day average	1.5 μg/m^3	--	--
	quarterly	--	1.5 μg/m^3	same as primary
Hydrogen Sulfide	1-hour	0.03 ppm (42 μg/m^3)	--	--
Vinyl Chloride	24-hour	0.010 ppm (26 μg/m^3)	--	--
Visibility Reducing Particles	1 observation (8 hours from 8 AM to 6 PM PST)	sufficient amount to produce extinction coefficient of 0.07 per kilometers due to particles when relative humidity <70%.	--	--

1. California Standards for ozone, carbon monoxide, sulfur dioxide (1- & 24-hour), nitrogen dioxide, PM_{10}, $PM_{2.5}$, and visibility reducing particles are not to be exceeded. Sulfate, lead, hydrogen sulfide, and vinyl chloride standards are not to be equaled or exceeded.
2. National Standards, (other than ozone, particulate matter, and those based upon annual averages or average arithmetic means) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest eight-hour concentration in a year, averaged over three-years, is equal to or less than the standard. For PM_{10}, the 24-hours standard is attained when 99% of the daily concentrations, averaged over three years, are equal to or less than the standard. For $PM_{2.5}$, the 24-hours standard is attained when 98% of the daily concentrations, averaged over three years, are equal to or less than the standard.
3. Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature and pressure of 25 ^{O} C and 760-mm Hg, respectively. Most measurements of air quality are to be corrected the reference temperature of 25 ^{O} C and reference pressure of 760-mm Hg; ppm in this table refers to ppm by volume or micromoles of pollutant per mole of gas.
4. National Primary Standards: The level of air quality necessary, with an adequate margin of safety to protect the public health.
5. National Secondary Standards: The level of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.
6. Approved by the California Air Resources Board and is expected to become effective in early 2006.
7. Not applicable to Santa Barbara County effective June 15, 2005.

3.1.2. Existing Air Quality

The U.S. EPA classifies air quality within each air quality control region with regard to its attainment of NAAQS. The California Air Resources Board does the same for CAAQS. An area with air quality better than state or federal ambient air quality standards for a specific pollutant is designated as attainment for that pollutant. Any area not meeting those standards is classified as non-attainment. Santa Barbara County is in attainment or unclassified for all the ambient air quality standards except for the state standard for PM_{10} and the state O_3 standards. Currently, air quality in Santa Barbara County is classified as maintenance attainment for the federal one-hour O_3 standard (U.S. EPA 2003).

The estimated emissions for Santa Barbara County and Vandenberg AFB are presented in Table 3-2. The Santa Barbara County emissions are 2000 daily planning emissions taken from the 2004 Santa Barbara County Air Pollution Control District (SBCAPCD) Clean Air Plan, while the Vandenberg AFB emissions are annual emissions taken from the 2001 Comprehensive Emission Inventory Draft Report.

3.2. Biological Resources

This section provides a description of the biological resources present at and near the buildings proposed for demolition or abandonment in this PEA. The scope of the survey includes vegetation and wildlife resources, as well as waters of the United States and wetlands. A total of 63 buildings, distributed throughout North and South Vandenberg AFB were visited for these surveys. The findings of these surveys are discussed in Chapter 4 of this PEA, and a summary is included in Appendix B.

Vandenberg AFB is located in a transitional ecological region that lies at the northern and southern distributional limits of many species, and contains diverse biological resources of considerable importance. The base provides habitat for many federal- and state-listed threatened, endangered, and special concern plant and animal species. Fourteen major habitat types have been described and mapped on the base (USAF 2003).

3.2.1. Methodology

The 63 buildings currently identified for this project were surveyed for biological resources between February and April 2005. Field surveys for biological resources included examining each building and an area extending 50 meters around the building. For buildings where natural resources exist nearby, dominant plant species and vegetation types were identified, and sight, sound, tracks, or other sign determined presence of wildlife. The potential occurrence of species not documented was examined by identifying the

Table 3-2.
Existing emissions.

Source	2000 Emissions [(a)]			
	Annual (Tons/Year)		Planning Day (Tons/Day)	
	NO_x	ROC	NO_x	ROC
Santa Barbara County				
Stationary Sources	2,096.61	3,666.69	5.5694	10.0551
Area-Wide Sources	350.26	3,064.28	0.4817	7.9368
Mobile Sources	13,803.73	8,687.04	37.8342	23.8465
OCS Sources	12,174.83	3,067.23	33.3674	2.9139
Natural Sources	1,364.58	28,930.40		
Total	**29,790.01**	**47,415.64**	**77.2527**	**44.7523**
Vandenberg AFB Annual	***1,133.75***	**229.39**	**ND**	**ND**

(a) Emissions are in tons/year.
ND = Not determined.

known habitat preferences of species. Surveys for sensitive species potentially occurring in the area were conducted concurrently with the biological field surveys. Potential occurrence of special status and sensitive species not detected during biological surveys was determined based on the presence of suitable habitat and/or known occurrence of the species. Sources used to determine potential occurrence include literature and maps of natural resources present at Vandenberg AFB (USAF 2003), California Natural Diversity Database (CNDDB; California Department of Fish and Game [CDFG] 1999, 2001, 2004a, 2004b) and existing local and regional references (Christopher 1996, 2002; Coulombe and Mahrdt 1976; Holmgren and Collins 1999; Keil and Holland 1998; Lehman 1994).

Many migratory bird species are only present during spring and summer, and most plant species can only be definitively identified during their blooming periods in spring and summer. Therefore, the results of the current surveys cannot be considered comprehensive. Plant taxa nomenclature in this report follows Hickman (1993) and Holland (1986). Species nomenclature for birds follows the American Ornithologists' Union (AOU 1998, 2000, 2002, 2003, 2004), and for other wildlife species, sources include Crother (2000), and Wilson and Cole (2000).

Specific information about natural resources including biological, sensitive, and wetland resources located at the 63 buildings is provided in Appendix B. The locations of each building are depicted in Figures 2-1A and 2-1B (Chapter 2) of this PEA.

3.2.2. Botanical Resources

Most of the 63 buildings surveyed are situated on asphalt or pavement surrounded mostly by non-native grassland and other ruderal type habitat. However, some of the buildings are surrounded by or very close to other habitats including Burton Mesa chaparral, Coastal dune scrub, Central coastal scrub, and eucalyptus-Monterey pine windbreak, which may be affected by demolition and abandonment activities.

Non-native Grassland

These grasslands are characterized by a dense to sparse cover of annual grasses with flowering culms up to two feet high. Dominant plant species include bromes (*Bromus* spp.), veldt grass (*Ehrharta calycina*), wild oats (*Avena* spp.), foxtail barley (*Hordeum murinum* spp. *leporinum*), ryegrass (*Lolium* spp.), fescues (*Vulpia* spp.), redtop grass (*Agrostis stolonifera*), filarees (*Erodium* spp.), mustards (*Brassica* spp.), California burclover (*Medicago polymorpha*), California plantain (*Plantago erecta*), and iceplant (*Carpobrotus* spp.). Non-native Grassland have replaced perennial, native bunchgrasses and areas historically dominated by native herbs (U.S. Air Force 2003).

Ruderal

Ruderal plant communities typically occur at roadsides, waste areas, and other sites continuously disturbed by activities such as traffic, road construction and road maintenance. Ruderal communities are dominated by annual and usually non-native forbs and grasses that can rapidly invade disturbed areas. Plant species commonly found at these sites include wild oats, soft chess brome (*Bromus hordeaceus*), veldt grass, fescues, black mustard (*Brassica nigra*), wild radish (*Raphanus sativus*), plantain, and coyote brush (*Baccharis pilularis*).

Burton Mesa Chaparral (Central Coast Maritime Chaparral)

Chaparral is a dense, evergreen, rigid, fire-adapted form of shrubby vegetation native to California's coastal areas. Central Coast Maritime Chaparral, which includes Burton Mesa Chaparral, is restricted mostly to Vandenberg AFB and its vicinity (Odion 1992) where it occurs on mesas and higher ridges. Manzanitas (*Arctostaphylos* spp.), California lilacs (*Ceanothus* spp.), and chamise (*Adenostoma fasciculatum*) dominate Central Coast Maritime Chaparral. Burton Mesa Chaparral is characterized by the presence of a group of endemic, codominant species, such as sand mesa (shagbark) manzanita (*Arctostaphylos rudis*), La Purisima manzanita (*Arctostaphylos purissima*), buck brush (*Ceanothus cuneatus*), and Santa Barbara ceanothus (*Ceanothus impressus*).

Coastal Dune Scrub

This diverse vegetation type is found along the central coast of California, on sandy backdunes stabilized by vegetation cover, behind foredunes, and in transitional dune areas. Coastal dune scrub has relatively dense and continuous plant cover, composed of scattered shrubs, subshrubs, and herbs, dominated by goldenbush (*Ericameria ericoides*), California sagebrush

(*Artemisia californica*) and bush lupine (*Lupinus chamissonis*). Also present are dune buckwheat (*Eriogonum parvifolium*), deerweed, California-aster (*Lessingia filaginifolia* var. *filaginifolia*). Important endemic plants in this community include San Luis Obispo monardella (*Monardella frutescens*), Blochman's leafy daisy (*Erigeron blochmaniae*), and black-flowered figwort (*Scrophularia atrata*). Coastal dune scrub occurs along most of the western coast of Vandenberg AFB.

Central Coastal Scrub

Coastal scrub is a diverse community that occupies a narrow corridor extending along almost the entire coast of California. Shallow-rooted, mesophyllic plant species that are often drought-deciduous and summer-dormant characterize this community. Common associates of this vegetation type include California sagebrush, coastal buckwheat (*Eriogonum parvifolium*), black sage (*Salvia mellifera*), silver dune lupine (*Lupinus chamissonis*), deerweed (*Lotus* spp.), and poison oak (*Toxicodendron diversilobum*). In disturbed or more mesic areas, the dominant species tends to be coyote brush.

Eucalyptus-Monterey Pine Windbreak

The shelterbelts of Vandenberg AFB consist of introduced trees, eucalyptus (*Eucalyptus* spp.) and Monterey pine (*Pinus radiata*). These trees have been grown primarily for their rapid rate of growth and the protection from wind that they provide. Although they have minimal ecological value, they provide habitat for monarch butterflies and raptor and great blue heron nesting sites.

3.2.3. Wildlife Resources

Vandenberg AFB contains diverse biological resources because of its location in the transitional geographic zone between central and southern coastal California. Within this ecotonal region, populations of many plant and animal species overlap at their southern or northern distributional limits.

Many wildlife species have the potential to occur within the habitats that occur near the buildings proposed for demolition or abandonment. However, because most of these buildings occur on asphalt or pavement, the likelihood of wildlife species existing within these sites is greatly reduced. It is expected that rodents such as various species of mice and California ground squirrels would be present at many of these sites. Of greater interest and concern is the presence of nesting birds, small passerines as well as the larger owls and raptor species, and bat species, which could roost and breed within these buildings. Buildings of concern due to the presence or potential presence of wildlife species are described below.

Several buildings presented evidence of potential for swallows and other passerine birds to nest, and others presented evidence of active nesting (Table 3-3). Most numerous of the nests observed were those of cliff swallows (*Hirundo pyrrhonota*), primarily on North Vandenberg AFB. These birds construct gourd-shaped mud nests under the eaves of buildings. They typically nest in colonies; most notable is at Building 1200 at the Santa Ynez Water Plant. Earliest migrants of cliff swallows arrive in the region along the coast in March, and are rare after the beginning of September. Other passerine birds that nest in the buildings include house finch (*Carpodacus mexicanus*), barn swallow (*Hirundo rustica*), black phoebe (*Sayornis nigricans*), white-throated swift (*Aeronautes saxatalis*) European starling (*Sturnus vulgaris*), Northern flicker (*Colaptes auratus*) and Western meadowlark (*Sturnella neglecta*). All of these bird species are protected under the Migratory Bird Treaty Act (MBTA) with the exception of European starling.

Several of the abandoned buildings were found to be roosting sites for owls and raptors, and either presented evidence of past nesting or characteristics to suggest potential nesting (Table 3-3). Great horned owls (*Bubo virginianus*) were observed at Building 946; in addition, barn owls (*Tyto alba*) were documented at Buildings 1537 and 1783, owl sign was found at Buildings 1823, 1825, 1835, 1836, and 1895; and sign of raptor nesting was found at Building 946. Owl and raptor species are protected under the MBTA.

Numerous buildings scheduled for demolition presented evidence of roosting bats or have the potential for being used by several bat species as roost or nursery sites (Table 3-3). A basewide bat inventory completed between April 1997 and July 1999 identified several buildings slated for demolition as housing bat roosts. These buildings include 535, 1200, 1537, 1823, 1825, 1830, 1835, 1836, 1853, and 1895. During general biological field surveys conducted for this PEA, Buildings 470, 480, 484, 488, 1202, and 1204, were also identified as either having roosting bats or with potential to house them.

Table 3-3.
Buildings with protected natural resources or with potential to support protected resources.

Building	Nesting Passerine Birds	Nesting/ Roosting Owls/ Raptors	Roosting Bats
98	Yes		
470	Potential		Yes
480	Yes		Potential
484	Potential	Potential	Potential
488	Yes		Potential
535	Yes		Yes
715	Yes		
733	Potential		
734	Potential		
736	Potential		
738	Yes		
768	Potential		
946	Yes	Yes	
1200	Yes		Yes
1201			
1202	Yes		Potential
1204			Potential
1205			
1209			
1537	Yes	Yes	Yes
1783	Yes	Yes	
1823	Yes	Yes	Yes
1825	Yes	Yes	Yes
1830			Yes
1835	Yes	Yes	Yes
1836	Yes	Yes	Yes
1853			Yes
1895		Yes	Yes
1952	Yes		
1953	Potential		Potential
1957	Potential		Potential
1958	Potential		Potential
1982	Yes		Potential
1992	Potential		Potential
1995	Potential		Potential

Buildings with documented natural resources or in close proximity to sensitive natural resources, where potential impacts could occur during demolition activities, are addressed in more detail below.

Building 98. This building on South Vandenberg AFB is located on Oak Mountain. It is located in disturbed Central Coastal Scrub dominated by California sagebrush and coyote brush. A black phoebe nest was documented on the exterior during the biological surveys. Although no evidence of nesting in the interior was found, broken windows could admit birds.

Building 470. This building on South Vandenberg AFB is located off Arguello Boulevard. Although the building is situated on pavement, the surrounding vegetation is composed of Burton Mesa Chaparral dominated by La Purisima manzanita. Openings in the building provide access to birds and bats. Pierson et al. (2002) documented the presence of a night roost of California myotis (Myotis californicus) and big brown bats (Eptesicus fuscus) inside this building.

Building 480. This building on South Vandenberg AFB is located off Arguello Boulevard above steep slopes. Vegetation immediately surrounding the building is non-native grassland comprised largely of bur clover, brome grasses, foxtail fescue (*Vulpia myuros),* and jubata grass (*Cortaderia jubata*) with scattered coyote brush. Building interior is accessible to birds and bats. Evidence of passerine bird nests inside the building was documented during the biological surveys for this project. Nesting barn swallows have been documented in the past inside this building (USAF 1998c).

Building 484. This building on South Vandenberg AFB is located off Arguello Boulevard. Although the building is situated on pavement, the surrounding vegetation is composed of Burton Mesa Chaparral dominated by La Purisima manzanita. Numerous openings in the building provide access for birds and bats.

Building 488. This building on South Vandenberg AFB is located off Arguello Boulevard. Although the building is situated on pavement, the surrounding vegetation is composed of Burton Mesa Chaparral dominated by La Purisima manzanita. Evidence of past nesting was observed during the biological surveys. Openings in the building provide access to bats as well.

Building 535. This building is located on South Vandenberg AFB along the east side of Coast Road between Point Pedernales and Point Arguello. Pierson et al. (2002) documented one bat species (*Myotis* sp.) inside this building. Evidence of bats roosting inside was also found during the biological surveys for this project.

Buildings 715, 716, 717, 733, 736, and 737. These buildings are on South Vandenberg AFB within the perimeter fence of SLC-4. The buildings are situated on concrete or asphalt and the nearest vegetation is mowed weedy non-native grassland composed of species such as iceplant,

veldt grass and brome grasses. White-throated swifts, house finches, barn swallows, black phoebes, and European starlings nest in these buildings.

Building 946. This building is on South Vandenberg AFB on the east of Coast Road and off of Cooke Road. The building is situated on asphalt. Weedy vegetation dominated by various annuals, such as filarees and brome grasses, borders the pavement grading into Central coastal scrub dominated by California sagebrush, coyote brush and mock heather. The biological surveys for this project revealed the presence of a black phoebe nest in the interior of the building, a raptor nest on the catwalk to the south side of the building, and a great-horned owl roosting near the raptor nest.

Buildings 1200, 1201, 1202, 1204, 1205, and 1209. These buildings are part of the now abandoned Santa Ynez Water Plant, located on North Vandenberg AFB, north of the Santa Ynez River, along the north side of Terra Road. A tree line composed mainly of Monterey pine with scattered eucalyptus trees borders the site. Vegetation adjacent to the buildings is mostly non-native grassland dominated by foxtail barley, bur clover and filarees. A botanical survey conducted in June 2005, confirmed the presence of Gaviota tarplant (*Deinandra increscens* ssp. *villosa*), a federal endangered plant species, on the eastern side of the site within a chain-link fenced area and outside the fence in the surrounding area. During the biological surveys for this project, numerous cliff swallow nests were observed on the exterior of Building 1200, and a black phoebe nest was documented on the exterior of Building 1202. Broken windows and gaps can admit birds and bats into the interior of both of these buildings as well. Pierson et al. (2002) documented a day roost of California myotis inside Building 1200.

Building 1505. This building is located on North Vandenberg AFB along the north side of 35th Street. Herbaceous annuals (redstem filaree [*Erodium cicutarium*], and buckhorn plantain [*Plantago coronopus*]) dominate the open area immediately below the tower structure. Santa Barbara ceanothus, buckbrush, black sage, and La Purisima manzanita dominate the Burton Mesa chaparral that surrounds the building.

Building 1537. This building is located on North Vandenberg AFB along the north side of 35th Street. Vegetation consists of mowed non-native annual grassland dominated by veldt grass, brome grasses, foxtail barley, burclover and iceplant. The building is open and cliff swallows and barn swallows were observed setting up nests during the biological surveys. There is also evidence of barn owl roosting inside the building. Pierson et al. (2002) documented one bat species (*Myotis* sp.) within this building.

Building 1783. This building is located on North Vandenberg AFB off of 13th Street near the ABRES complex. Cliff swallow nests are present on the exterior of the building. The biological surveys for this project encountered evidence of barn owl presence below a hole in the wall on the northwest corner of the building. The hole is large enough to admit barn owls inside the building.

Building 1823. This a partly subterranean building located on North Vandenberg AFB off of Umbra Road. The vegetation is primarily composed of non-native grassland species dominated by veldt grass and iceplant, with some coyote brush and mock heather growing by the entry way. House finches appear to be nesting in the vegetation surrounding the entryway. Sizable accumulations of barn owl pellets found throughout the building suggest this is a roosting site and potentially a nesting site. Light to moderate bat guano accumulations present in the interior also indicate this building is a bat roost.

Building 1825. This building is located on North Vandenberg AFB off of Umbra Road. Non-native grassland is the dominant community in the area, with black mustard, common sowthistle (*Sonchus oleraceus*), iceplant, ripgut brome (*Bromus diandrus*), bur clover, and foxtail barley being the dominant species. There is evidence of extensive use of this building by barn owls. During the biological surveys, barn swallows were observed constructing nests on the exterior. Pierson et al. (2002) documented a day roost of big brown bats. Bat guano was detected during the biological surveys, although it was not fresh.

Building 1830. This building is located on North Vandenberg AFB off of Umbra Road. Non-native grassland is the dominant community in the area, with black mustard, common sowthistle, iceplant, ripgut brome, bur clover, and foxtail barley being the dominant species. Pierson et al. (2002) documented a night roost of California myotis.

Building 1835. This building is located on North Vandenberg AFB off of Umbra Road. Non-native grassland is the dominant community in the area, with black mustard, common sowthistle, iceplant, ripgut brome, bur clover, and foxtail barley being the dominant species. There is evidence of past

nesting by passerines above the sliding door of this building. Also, the accumulation of owl pellets at the east side of the building and the structural appearance of the building indicate to the potential for owls to nest here. Inside the building, there is a partially enclosed room at the rear with a large accumulation of owl pellets and heavily whitewashed walls, which indicate that owls are likely to nest in the overhead piping. Pierson et al. (2002) documented the presence of a day roost of big brown bats.

Building 1836. This building is located on North Vandenberg AFB off of Umbra Road. The vegetation is primarily composed of non-native grassland species that are regularly mowed. During the biological surveys, nesting house finches and black phoebes were documented in the outer rooms. Sizable presence of pellets and feathers indicate the extensive use of this building by barn owls. Pierson et al. (2002) documented the presence of a night roost of bats (*Myotis* spp.). Guano accumulations were observed during the biological surveys, with the most sizable one located in a metal tube connecting the building to an adjacent structure.

Building 1853. This building is located on North Vandenberg AFB off of El Rancho Road. The vegetation at this site is a mixture of coyote brush, iceplant, bur clover, garden vetch (*Vicia sativa*), and filarees, with some low growing exotic trees near the entrance. Pierson et al. (2002) documented the presence of a day roost of Townsend's big-eared bats.

Building 1874. This building is located on North Vandenberg AFB off of El Rancho Road. The vegetation in the vicinity is non-native grassland comprised of ripgut brome, iceplant, garden vetch, soft brome, foxtail fescue, veldt grass, sky lupine (*Lupinus nanus*), and scattered coyote brush. While no evidence of past nesting was documented, Western meadowlarks could nest in grassy areas.

Building 1895. This building is located on North Vandenberg AFB off of Encelados Road. The site is vegetated by non-native grassland comprised of foxtail fescue, red brome (*Bromus madritensis*), bur clover, and ripgut brome, with a few California sagebrush, Coyote brush, and arroyo willows growing adjacent to the buildings. There are sizable pellet and whitewash accumulations inside the building indicating the presence of roosting owls. Roosting big brown bats were documented during the biological surveys for this project. Pierson et al. (2002) documented the presence of day and night roosts for various species of bats including California myotis, big brown bat, Mexican free-tailed bat (*Tadarida brasiliensis*), Yuma myotis (*Myotis yumanensis*), and *Myotis* spp.

Buildings 1952 and 1982. These buildings are located on North Vandenberg AFB off of Point Sal Road. The buildings sit on concrete pads surrounded by mowed non-native grassland type vegetation. During the biological surveys, extensive cliff swallow nests were documented on the exterior of Building 1952 and two nests on the exterior of Building 1982. However, Building 1982 has holes near the roof that could provide interior access to small birds and bats.

Buildings 1953, 1957, 1958, 1992, and 1995. These buildings are located on North Vandenberg AFB off of Point Sal Road. The buildings sit on concrete pads surrounded by mowed non-native grassland type vegetation. Although no nests were documented during the biological surveys, holes near the roof could provide interior access to small birds and bats.

3.2.4. Sensitive Plant Communities and Special Status Species

Sensitive plant communities that occur within the vicinity of buildings proposed for demolition or abandonment include Burton Mesa Chaparral and Freshwater Marsh (Wetland). Burton Mesa chaparral was documented near Buildings 470, 480, 484, and 488 on South Vandenberg AFB, and Building 1505 on North Vandenberg AFB (Table 3-4).

One special status plant species, Gaviota tarplant occurs at the Santa Ynez Water Plant (Buildings 1200, 1201, 1202, 1204, 1205 and 1209) on the north side of Terra Road in North Vandenberg AFB. Gaviota tarplant was documented on the eastern side of this facility during a botanical survey completed in May 2005 within a chain-link fenced area and the non-native grassland type vegetation immediately adjacent to the fence (Figure 3-1).

No special status wildlife species were detected during the biological surveys. However, most of the avian species detected within the buildings, as well as their nests, eggs and nestlings would be protected under the MBTA.

Table 3-4.
Sensitive habitats and special plant and wildlife species that occur or have the potential to occur at or near buildings slated for demolition or abandonment.

Protected Resource	Status†	Occurrence	Location	Reproductive Period
Burton Mesa Chaparral	California Sensitive Habitat	Documented	470, 480, 484, 488, 1505	
Gaviota tarplant *Deinandra increscens* ssp. *villosa*	FE/SE	Documented	Santa Ynez Water Plant (Buildings 1200, 1201, 1204, 1205, and 1209)	May – Aug

† FE – Federal Endangered Species; SE – California Endangered Species

Figure 3-1. Location of Gaviota tarplant at Santa Ynez Water Plant.

3.2.5. Waters of the United States and Wetlands

For the wetland hydrology criterion to be met a site must be inundated or saturated or exhibit features that show the area was inundated or saturated for the required period of time (i.e., 45 days). A hydric soil is defined as "…a soil that is saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions that favor the growth and regeneration of hydrophilic vegetation (Environmental Laboratory 1987). No wetlands exist within any of the sites of buildings proposed for demolition and/or abandonment in this PEA.

3.3. Cultural Resources

A summary of the prehistory and ethnohistory as it relates to the cultural setting is provided in Appendix C. Also included in Appendix C are all tables listing archaeological studies completed within 1.0 mile of each of the buildings slated for demolition.

An archaeological site records and literature search was completed at the offices of the 30th Cultural Resources Section (30 CES/CEVPC) and the Central Coast Information Center at the University of California, Santa Barbara (UCSB). Background research included a review of the archaeological literature, archaeological base maps, and cultural resource records. Previous archaeological studies within 1.0 mile of each proposed demolition complex were identified; previously recorded archaeological sites and isolated artifacts within 0.25 mile were also identified. Maps examined at the 30 CES/CEVPC include the Vandenberg AFB C-1 series (46 map set), the Base Comprehensive Plan Geographic Information System (GIS), and U.S. Geological Survey (USGS) 15-foot topographic quadrangle maps. Electronic GIS theme files examined include ARCHSITE 2000, ISOLATE2000, CULPOLY, CULPTS, CULROADs, CULSTORM, CULSTORM_NEW, and CULTURAL_SURVEY_AREA. All demolition complexes discussed below have previously been surveyed for archaeological resources.

In the mid-1990s, the Tri-Services Cultural Resources Research Center at the United States Army Construction Engineering Research Laboratory (USACERL) completed a three-phase inventory and evaluation of Cold War properties on Vandenberg AFB to assist the installation in its effort to comply with Section 106 of the National Historic Preservation Act (Nowlan et al. 1996; Nowlan and McCullough 1997; McCullough and Nowlan 1997). That effort culminated in a *Historic Preservation Plan for the Management and Treatment of Cold War Properties at Vandenberg Air Force Base, California* (HPP) that was part of a *Programmatic Agreement between Vandenberg Air Force Base, California and the California State Historic Preservation Officer Regarding the Management of Exceptionally Important Cold War Historic Properties under the Jurisdiction of Vandenberg Air Force Base, California.* The USACERL documents, the Programmatic Agreement, and the HPP were consulted during the background research. In addition, Palmer (1999, 2000) completed an inventory of historic sites, buildings, and structures on Vandenberg AFB. Facilities that were not identified and evaluated by the USACERL or Palmer do not qualify as historic properties.

Cultural resources in the vicinities of the project areas are presented grouped by complexes where appropriate.

Oak Mountain Booster Station and Water Storage Tank

Buildings 98 and 99 are slated for demolition in this complex. Background research revealed that no archaeological sites or isolated artifacts are recorded within 0.25 mile of the complex. Only three archaeological studies have been completed within 1.0 mile of the complex (Table C-1, Appendix C). The buildings themselves were not identified as potentially significant in the Palmer (2000) or USACERL studies.

General Electric Radio Tracking Station (GERTS) Facilities

This complex includes Buildings 470, 480, 484, and 488 as candidates for demolition. GERTS is a radio ground-guidance system originally developed for the Atlas D Series Weapons System. Building 488, constructed in 1959 for range operations, was adapted for the GERTS in 1961, and Buildings 470 and 480 were constructed in that same year. GERTS served as a flight control instrumentation system for both Atlas (D, E, and F) and Titan (I and II) launches between 1961 and 1967. Buildings 470 and 480 were abandoned in the late 1960s, although

Building 488 was used for an Atlas E space launch as recently as March 1995. Due to their military importance in the Cold War, GERTS Buildings 470, 480, and 488 were recommended eligible for the National Register of Historic Places (NRHP) during the USACERL study (Nowlan et al. 1996:221–228) and were subsequently determined eligible in the Programmatic Agreement for Cold War properties.

Background research indicates that no archaeological sites are recorded within 0.25 mile of the complex. A single isolated artifact (VAFB-ISO-654, a leaf-shaped projectile point) is within the 0.25-mile radius, but it is more than 250 meters from the complex. Background research also indicates that 24 archaeological studies have been completed within 1.0 mile of the GERTS complex (Table C-2, Appendix C).

Building 535

Building 535 (Power Plant No. 6) was not identified as an important building during the Palmer (2000) or USACERL studies.

Background research identified six archaeological sites within 0.25 mile of Building 535, including CA-SBA-212, -661, -662, -666, -1145/H, and -1679. No isolated artifacts are within the 0.25-mile radius. Background research also revealed that 39 archaeological studies have been completed within 1.0 mile of Building 535 (Table C-3, Appendix C).

Although six archaeological sites are within a 0.25-mile radius around Building 535, none are in the immediate vicinity of the facility. The closest site is CA-SBA-1145/H, more than 50 meters away. This site is primarily historical, and is associated with the Honda section house complex for the Southern Pacific Railroad. The prehistoric component is reportedly a very sparse scatter of lithic artifacts, although Applied EarthWorks (Æ) ongoing investigations at the site suggest that the lithic artifacts might actually be associated with the historical component. Previous archaeological studies (Gibson 1984; Maschner et al. 1991; Lebow et al. 2003; Schilz 1985; Snethkamp and Munns 1991) have adequately demonstrated that CA-SBA-1145/H does not extend to Building 535.

Building 702

This 250,000-gallon water tank was not identified as a potentially significant building during the Palmer (2000) or USACERL studies.

Background research revealed that no isolated artifacts are within 0.25 mile of the water tank and that only a single archaeological site, CA-SBA-2305, is within that radius. However, it lies more than 100 meters from the water tank. Background research also revealed that 25 archaeological studies have been completed within 1.0 mile of the water tank (Table C-4, Appendix C). Most of these studies were completed in conjunction with repairs, restoration, and upgrades to SLC-4.

SLC-4

Construction of SLC-4 began in 1961. Initially, the two launch pads (designated SLC-4E and SLC-4W) were designed to launch Atlas/Agena vehicles. The first launch occurred on 12 July 1963. Over time, the pads were modified to accommodate various Titan launch vehicles. SLC-4 has played an important role in the U.S. military space program, with many launches of classified reconnaissance satellite systems (Nowlan et al. 1996:109–111). Preliminary findings by a contractor recommended to Vandenberg AFB that SLC-4 (East and West) was eligible for listing on the NRHP. However, in subsequent consultation with the State Historic Preservation Office (SHPO), it was determined that SLC-4 was not NRHP eligible because of the vast amount of upgrade alterations that had affects its historic fabric.

Background research at 30 CES/CEVPC and the Central Coast Information Center revealed that 38 archaeological studies have previously been completed within 1.0 mile of the SLC-4 demolition project area (Table C-5, Appendix C). Background research also revealed that four sites (CA-SBA-537, -1127, -1815, and -1816) and two isolated artifacts (VAFB-ISO-265 and -300) are recorded within 0.25 mile of the SLC-4 project area.

One of the sites, CA-SBA-537, is within the Heritage Launch Program Demolition project area. CA-SBA-1816, while recorded as a separate site, is within CA-SBA-537 but outside the SLC-4 demolition project area. Because CA-SBA-1816 is within CA-SBA-537, the two sites are more appropriately considered a single complex (CA-SBA-537/1816). The site complex is nearly 750 meters long but is only 180 meters at its widest point. Overall, it encompasses approximately 97,850 square meters. It is comprised of six artifact concentrations (four within CA-SBA-537 and two within CA-SBA-1816).

Approximately 35 percent of the site complex lies within the security fence surrounding SLC-4. More precisely, the site encompasses much of the western edge of SLC-4, including two of the buildings (733 and 734) and a portion of the security fence to be demolished. Much of the site was disturbed during construction and upgrades of the launch complex; Schmidt and Bergin (1990:4-2) estimate that less than 40 percent of the site is intact.

Three archaeological studies have been completed at the CA-SBA-537/1816 site complex in conjunction with repairs or upgrades to SLC-4. The first of these was supporting repair and restoration work at the launch complex, including installation of a new security fence (Moore et al. 1988). Most of this restoration work was necessary after a Titan 34D missile launch failed and destroyed portions of the launch facility. The testing effort included 45 1x1 meter excavation units and 92 shovel test pits; the total excavated volume was 56.7 cubic meters. Altogether, excavations yielded 7,525 flakes, five cores, nine early stage bifaces, 6 finished bifaces (including four projectile points), 18 utilized flakes, 38 utilized flake knives, five cores, one abrader, one hammerstone, two punches, 56.8 grams of marine shell (primarily California mussel), and 632 kilograms of bone (primarily large mammal). Radiocarbon analysis of two shell samples yielded uncorrected radiocarbon dates of 570 ± 80 B.P. and 500 ± 90 B.P.

CA-SBA-1816 was treated as a separate site during the study, and was tested with seven 1x1 meter excavation units, 49 shovel test pits, and five auger borings. The total excavated volume was 15.3 cubic meters (Moore et al. 1988). Radiocarbon analysis returned uncorrected radiocarbon ages ranging 420 ± 70 B.P and 1040 ± 70 B.P. Investigations yielded 1,272 flakes, eight ground stone implement, two biface/preforms, one projectile point, 18 possible utilized flakes, five tarring pebbles, one punch/scraper, 37,820.8 grams of marine shell, 612 kilograms of bone (primarily deer), and 5,792.5 grams of fire-altered rock.

Based on the testing results, CA-SBA-537 was interpreted as a resource-processing site and CA-SBA-1816 as a short-term residence/resource-processing site (Moore et al. 1988). Both were found to contain data important to understanding prehistory and were considered eligible for the NRHP. CA-SBA-537 was officially determined eligible for the NRHP by the Air Force in consultation with SHPO in June of 1987; CA-SBA-1816 was determined eligible in August of 1988. The proposed security fence was redesigned to minimize adverse effects to cultural resources, but CA-SBA-537/1816 could not be entirely avoided.

Data recovery excavations to mitigate adverse effects from installation of the security fence included 87 excavation units, with a total volume of 99 cubic meters (Environmental Solutions (1990). Excavations at CA-SBA-537 yielded 1,918 bones (122.57 grams); identified taxa included mule deer, jackrabbit, cottontail or brush rabbit, ground squirrel, pocket gopher, and other small mammals. Marine shell, with a total weight of 63.23 grams, was primarily California mussel. Lithic artifacts included two ground stone implements, four bifaces, 11 blanks, two retouched scrapers, seven utilized flakes, and two utilized knives. CA-SBA-1816 yielded 19,641 bones (484.4 grams); identified taxa included mule deer, sea otter, weasel, jackrabbit, cottontail or brush rabbit, and various small mammals. Approximately 10,838 grams of marine shell were recovered, an assemblage dominated by California mussel.

The final project associated with SLC-4 repair and restoration was for a power system upgrade (Schmidt and Bergin 1990). Specifically, two utility poles and associated guyline anchors were to be placed in the portion of CA-SBA-537 west of Old Surf Road. Archaeological studies included excavation of five shovel test pits and three test excavation units of various sizes to determine if the site's significant qualities would be affected by installation of the utility poles. Few cultural items were recovered from intact sediments and installation of the utility poles was not considered an adverse effect to the site's significant qualities.

Between testing to evaluate NRHP eligibility (Moore et al. 1988), data recovery excavations to mitigate the effects of the security fence installation (Environmental Solutions 1990), and excavations to assess effects from installation of utility poles (Schmidt and Bergin 1990), the total volume of excavation completed at CA-SBA-537/1816 for repairs and upgrades at SLC-4 was 179.7 cubic meters.

Despite the extensive amount of excavation associated with SLC-4 repair and restoration, the portion of the site around the SLC-4 buildings within the Heritage Launch Program Demolition project area was inadequately sampled.

Consequently, testing in the vicinity of these buildings was considered necessary to assess potential adverse effects from demolition. Toward this goal, Æ excavated 25 shovel test pits and one 1x1 meter test excavation unit in the vicinity of the buildings to be demolished. Only four shovel test pits yielded cultural materials from intact sediments, found at depths from 40–80 centimeters below the surface. Only two of the buildings (733 and 734) and a portion of the security fence to be demolished were found to be within the site boundaries. Altogether, including the test excavation unit, Æ's effort yielded only 72 flakes from intact sediments. No tools, marine shell, vertebrate faunal remains, or fire-altered rock was recovered from intact sediments. Overall, the density of lithic debitage from intact sediments was only 58.6 per cubic meter (Lebow et al. 2005).

Building 768

Building 768 is within the SLC-3 complex. SLC-3 was evaluated as NRHP eligible during the early 1990s (Alford et al. 1991a, 1991b). In December 1992 Vandenberg AFB officially determined the complex eligible for the NRHP in consultation with the SHPO. In particular, it was considered significant because of its historic function as a launch complex. In concurring, SHPO noted that SLC-3 may also be significant due to its unique and distinctive qualities.

Background research revealed that 53 archaeological studies have been completed within 1.0 mile of SLC-3 (Table C-6, Appendix C). Five archaeological sites are within 0.25 mile of SLC-3: CA-SBA-2423, -2424, -2426, -2613, and -3554H. None of these sites are within the launch complex and the nearest sites are more than 300 meters away from either of the buildings to be demolished. Background research also revealed that 10 isolated artifacts (VAFB-ISO-207, -208, -209, -210, -212, -213, -214, -215, -638, and -639) are within the 0.25-mile radius. However, all but one are more than 250 meters from Building 768. The exception is VAFB-ISO-209, which was documented as a Monterey chert core and lies approximately 57 meters from Building 768. Its plotted location is within a road and adjacent to several buildings. Shovel test units at VAFB-ISO-209 yielded one chert flake and one marine shell fragment amongst fragments of recent metal, asphalt, and concrete (York 1992), indicating that the location has no integrity.

Building 946

Building 946, the X-Ray Facility, was not identified as a significant building during the inventories of structures completed by USACERL or Palmer (2000).

Background research at 30 CES/CEVPC and at the Central Coast Information Center reveals that no archaeological sites are recorded within 0.25 mile of Building 946 but that 14 isolated artifacts are documented within that radius. Background research also revealed that 33 cultural resources studies have previously been completed within 1.0 mile of Building 946 (Table C-7, Appendix C).

Three of the isolated artifacts (VAFB-ISO-223, -394, and -395) within 0.25 mile of Building 946 are within 40 meters of the security fence. VAFB-ISO-223 is a Monterey chert flake that was recorded during an archaeological survey for the Titan IV Rocket Motor Storage Program (Stone 1993). The artifact's plotted location is about 33 meters east of the security fence. As part of the archaeological studies for the Heritage Launch Program Demolition project (Lebow et al. 2005), Æ excavated four shovel test pits in the immediate vicinity of the artifact's plotted location to determine whether the artifact was truly isolated, or if it represented the only visible evidence of a larger archaeological site. No cultural materials were recovered in any of the four shovel test pits, indicating that VAFB-ISO-223 is truly an isolated artifact.

VAFB-ISO-394 and -395 were both identified during monitoring for the Space Transportation System (Wong 1980). VAFB-ISO-394 was recorded as a chert flake or unmodified chert chunk and is plotted 40 meters west of the security fence around Building 946. Æ excavated four shovel test pits in the immediate vicinity of the artifact's plotted location. No cultural materials were recovered in any of the four probes and it appears that VAFB-ISO-394 is also truly an isolated artifact. VAFB-ISO-395 is a chert core or unmodified piece of chert plotted 5 meters west of the security fence around Building 946. Four shovel test pits excavated in the immediate vicinity of the artifact's plotted location failed to find any cultural materials, indicating that the isolated artifact does not represent a larger archaeological deposit (Lebow et al. 2005).

Santa Ynez Water Plant and Associated Facilities

Buildings scheduled for demolition in this complex include 1200, 1201, 1202, 1204, 1205, and 1209. None of these structures were identified as significant during the USACERL or Palmer (2000) studies.

Background research at the 30 CES/CEVPC and the Central Coast Information Center revealed that CA-SBA-1891 is the only archaeological site recorded within 0.25 mile of the Santa Ynez Water Treatment Plant. It is adjacent to the water treatment plant. Two isolated artifacts have also been documented within that radius: VAFB-ISO-187 is the distal end of a biface fragment and VAFB-ISO-768 includes two artifacts, a chopping tool and a tertiary flake. Background research also revealed that 24 cultural resources studies have previously been completed within 1.0 mile of the Santa Ynez Water Treatment Plant (Table C-8, Appendix C).

Gibson, Centeno, and Schuyler initially recorded CA-SBA-1891 during a flurry of activity in 1984–1985 for the Union Oil Pipeline (Bowser et al. 1986; Gibson 1985; King et al. 1985). At that time, the site was noted about 250 meters north of the Santa Ynez Water Treatment Plant and described as a low-density scatter of marine shell, chert flakes, bifaces, and fire-altered rock. A few chert flakes were subsequently observed along both sides of Terra Road, and in 1985 the site boundary was extended south to include these artifacts. Foster (1985) monitored a boring within CA-SBA-1891 and observed chert flakes at the site, although not in the borehole.

The first archaeological excavations at the site were undertaken by URS Corporation (Bowser et al. 1986) as part of an effort to evaluate the significance of archaeological sites for the proposed Union Oil Pipeline. That effort included collection of all artifacts observed on the surface in the pipeline corridor; excavation of 11 shovel test pits to define site boundaries; and excavation of three 1x1 meter test excavation units to collect a sample of the archaeological remains. The total excavated volume was 5.9 cubic meters. All of that effort was north of the Santa Ynez Water Treatment Plant and yielded 2,675 flakes, two bifaces, 809.73 grams of fire-altered rock, 344.14 grams of marine shell, 0.56 grams of animal bone, and 0.17 grams of asphaltum. Radiocarbon analysis of two marine shell samples yielded age determinations of A.D. 1512 and 826 B.C. (Woodman et al. 1991:252). Based on the results of excavations, Bowser et al. (1986) interpreted CA-SBA-1891 as a habitation site and recommended that it was eligible for the NRHP. The pipeline route was subsequently shifted north to avoid the site.

Additional archaeological materials were discovered outside the previously defined boundaries during an inspection of the new route. Consequently, additional studies were completed in 1986 by Science Applications International Corporation (SAIC) to investigate the newly discovered materials. That effort included excavation of 16 shovel test pits and three 1x1 meter test excavation units, with a total volume of 5.0 cubic meters. This effort yielded two lithic tools, 180 flakes, 96.6 grams of bone, 3.05 grams of marine shell, and 5.5 grams of fire-altered rock. Based on the results of both the URS and SAIC excavations, the site was interpreted as a short-term residential site. Two spatially distinct activity areas were identified: one where tool maintenance was emphasized and one where food was prepared and consumed. Most site activities were thought to be associated with the Late Period, while the occupation associated with the earlier radiocarbon date was considered ephemeral (Peter and Dondero 1991).

Following the recommendation of significance by Bowser et al. (1986), and in consultation with the State Historic Preservation Office (SHPO), the Air Force officially determined CA-SBA-1891 eligible for the NRHP in October of 1997.

The next substantial archaeological investigations at CA-SBA-1891 occurred in 1997 in conjunction with installation of a 2,500-gallon septic tank and associated leach lines and septic lines (Harro and Ryan 1997). The project area was just west of the Santa Ynez Water Treatment Plant, in the southern part of the site and well south of the higher density archaeological deposit in the northern end of the site. Because CA-SBA-1891 had previously been determined eligible for the NRHP, the purpose of the septic system archaeological investigations was to ascertain whether installation of the septic system would adversely affect the site's significant qualities. Toward that goal, six 1x1 meter units were excavated within the APE. All were excavated 150 centimeters deep. Harro and Ryan (1997:4-6–4-7) noted stratigraphic differences from those reported by Peter and Dondero (1991) in the northern part of the site. Specifically, a sandy alluvium that contained most of the cultural

deposit in the northern part of the site was not evident in units excavated in the septic system project area. Æ's excavations in the septic system APE yielded only 13 flakes, a density of 1.5 flakes per cubic meter. No tools, marine shell, or faunal remains were recovered. Based on these results, Harro and Ryan (1997:4-11) opined that installation of the septic system would not adversely affect CA-SBA-1891.

The Santa Ynez Water Plant is immediately east of CA-SBA-1891, although the densest cultural deposit that was originally recorded as the site is about 250 meters to the north. To determine whether the site would be adversely affected by demolishing the treatment plant buildings, Æ excavated 14 shovel test pits between the buildings and the site boundary (Lebow et al. 2005). These units revealed that imported fill extended from the surface to depths ranging between 40 and 100 centimeters below the surface. No archaeological remains were found in intact sediments below the fill. These results support the previous testing effort for the septic system (Harro and Ryan 1997) that found only a very sparse scatter of artifacts within the eastern part of the site.

Building 1505

This water tank was not identified as a potentially significant structure during the Palmer (2000) or USACERL inventories.

Background research identified a single site (CA-SBA-1147) and a single isolated artifact (VAFB-ISO-475) within 0.25 mile of Building 1505. However, neither resource is within 200 meters of the water tank. Background research also indicates that 21 archaeological studies have been completed within 1.0 mile of Building 1505 (Table C-9, Appendix C).

576 FLTS Munitions Storage

Buildings 1537, 1538, and 1539 are scheduled for demolition in this complex. None of these were identified as potentially significant during the Palmer (2000) or USACERL inventories.

Background research identified a single archaeological site (CA-SBA-1147) and a single isolated artifact (VAFB-ISO-475) within 0.25 mile of the 576 FLTS Munitions Storage. Both the site and the isolated artifact are more than 200 meters from the security fence surrounding the facility. Background research also indicates that 18 archaeological studies have been completed within 1.0 mile of the proposed demolition project (Table C-10, Appendix C).

Building 1783

Building 1783 is associated with the Advanced Ballistic Missile Re-Entry System (ABRES) facility complex originally built in 1957 and designated Complex 65-1. The three-pad complex was constructed for the Atlas D operational testing program. Prior to the first launch, the complex was renamed 576-A, and the first launch occurred in 1959. Beginning in 1960, the complex was used for operational readiness training, which continued until 1963. Between 1962 and 1964, the installation was used to launch Atlas D ICBMs as targets for the Army's anti-missile missile. In 1963, the first ABRES was launched from the complex; these launches continued periodically through October 1974. During this period, the Air Force changed the designation of the complex, first to ABRES-A and subsequently to BRMS-A. Combined, the three pads in the complex saw a total of 83 Atlas launches. The entire complex was mothballed until 1982, when Pad-3 was modified to support the High Performance Target Engine Measurement (HPTEM) program. However, that program was cancelled before the modified facility was ever used. In 1984, the Air Force removed the missile service towers at Pads 1 and 2. Beginning in 1984, American Rocket, Inc. leased Pad 3 and modified the service tower to accommodate a commercial launch vehicle. Consequently, and because the facility has lost the integrity of its historic function, the ABRES A facility is ineligible for the NRHP (McCullough and Nowlan 1997).

Background research revealed that three archaeological sites (CA-SBA-1043, -1044, and -3228) and four isolated artifacts (VAFB-ISO-307, -308, -553, and -576) are within 0.25 mile of the ABRES A Facility. None of the archaeological sites are within 200 meters of the buildings to be demolished. The closest of the isolated artifacts, VAFB-ISO-307, is about 130 meters away. Background research also revealed that 21 archaeological studies have been completed within 1.0 mile of the building to be demolished (Table C-11, Appendix C); most of these projects are associated with the MX or Peacekeeper/Rail Garrison missile projects on the San Antonio Terrace.

ABRES B Launch Complexes

Buildings 1823, 1825, 1830, 1835, and 1836 are to be demolished. These include buildings in both the Atlas 576-B Launch Complex (Buildings 1823, 1825, and 1830) and the 576-F Launch Complex (Building 1836). The Atlas 576-B Launch Complex, originally designated Complex 65-2, was built in 1958 and 1959. Just prior to the first launch on 22 April 1960 it was renamed 576-B. By mid November 1963, 35 Atlas missiles had been launched. The facility was used for the ABRES beginning in 1965, with 21 launches between 12 January 1965 and 7 November 1967. The complex was then decommissioned and all important and useful information was removed. Consequently, the buildings have lost the integrity of their historic function and are not considered eligible for the NRHP (McCullough and Nowlan 1997).

The Atlas 576-F Launch Complex constructed in 1959–1960 for the Atlas E ICBM. The first launch resulted in an explosion shortly after lift-off, but the damage was repaired and a successful launch of an Atlas E occurred on 28 February 1962. Ten launches took place by 27 August 1964, when the Air Force began replacing the Atlas series with the Titan II and Minuteman ICBMs. The Atlas 576-F Launch Complex was decommissioned and all-important equipment was removed. Consequently, the site does not have the integrity of its historic function and it is ineligible for the NRHP (McCullough and Nowlan 1997).

Background research at 30 CES/CEVPC and the Central Coast Information Center revealed that 25 archaeological studies have been documented within 1.0 mile of the Atlas 576-B and -F Launch Complexes (Table C-12, Appendix C). Most of these are associated with the MX missile project (Air Force Flight Test Center 1983; Bixler et al. 1980; Brown 1984; Chambers Consultants and Planners 1984; Craig 1980; HDR Sciences 1982; Moore and Snethkamp 1982; Snethkamp 1981) or the Peacekeeper/Rail Garrison project (Earth Technology Corp. 1991; Tetra Tech 1987a, 1987b, 1988, 1990, 1991; URS-Berger 1985; Walsh and Gray 1988; Weitze 1994).

Background research also revealed that eight archaeological sites are recorded within 0.25 mile of the Atlas 576-B and 576-F Launch Complex, including CA-SBA-535, -706, -980, -1000, -1070/1070E/1071, -1730, -1778, and -3002. All of these sites are within the San Antonio Terrace Archaeological District, which was created to facilitate site management during studies for the various Intercontinental Ballistic Missile (ICBM) programs. Because they are within the district, they are considered eligible for the NRHP (Tetra Tech 1988).

No sites or isolated artifacts are in the immediate vicinity of the Atlas 576-B buildings to be demolished.

Two of sites, CA-SBA-1070/1070E/1071 and -1778, are in the immediate vicinity of the Atlas 576-F Launch Complex. The site complex of CA-SBA-1070/1070E/1071 was originally recorded as three separate sites. Spanne recorded CA-SBA-1070 in 1973 as a sparse to moderate-density scatter of lithic debitage and marine shell southwest of the Atlas 576-F Launch Complex. CA-SBA-1071, also recorded by Spanne, was similar but more south than west of the facility. During studies for the MX missile project, CA-SBA-1070E was recorded as a separate site partially within the Atlas 576-F Launch Complex (Chambers Consultants and Planners 1984:3-38). Because no more than 50 meters was found to separate these three sites, they were combined into a single complex during an archaeological survey following the Peacekeeper Wildfire (Mirro and Lebow 2003). CA-SBA-1778 was recorded as a sparse scatter of lithic artifacts and marine shell during a survey for the Stage Storage Facility as part of the MX missile project (Chambers Consultants and Planners 1984).

Archaeological studies were completed at CA-SBA-1778 and at components of the CA-SBA-1070/1070E/1071 complex for the MX missile project (Chambers Consultants and Planners 1984). CA-SBA-1070 was investigated because a proposed fiber-optic cable was installed through the site parallel to Umbra Road. Associated studies included a walk-over of a 20-meter-wide corridor, excavation of 26 shovel test pits (each 50 centimeters deep), and excavation of a single 1x1 meter unit to a depth of 120 centimeters. The total excavation volume was 2.34 cubic meters, all limited to the 20-meter-wide corridor along the south side of Umbra Road.

Excavations yielded more than 1,275 flakes, four bifaces, a scraper, and a tool of undetermined function. Also recovered were 223.6 grams of marine shell, 31 vertebrate faunal remains (with a total weight of 2.61 grams), a single piece of asphaltum weighing 7.6 grams, and five fire-altered rocks with a total weight of 313.6 grams. Bifaces included two small leaf-shaped

projectile points, which were considered evidence of occupations postdating A.D. 500. Based on the results of investigations, CA-SBA-1070 was interpreted as a seasonal residential base (Chambers Consultants and Planners 1984).

Investigations for the MX missile project also included work within the Atlas 576-F Launch Complex. CA-SBA-1778 was discovered within the launch facility during a survey for the Stage Storage Facility. A total of 63 shovel test pits were excavated to depths of 80 centimeters, revealing that modern construction material was mixed with and often below the depths of prehistoric cultural materials. Consequently, the site was determined to retain little or no integrity and was evaluated as insignificant (Chambers Consultants and Planners 1984:3-40).

In addition, CA-SBA-1070E was discovered during the survey for the Stage Storage Facility. It was tested with three 1x1 meter units and a single shovel test pit. The total excavation volume was 3.13 cubic meters; this volume yielded 112 flakes, a small leaf-shaped projectile point diagnostic of the Late Period, a biface, 0.4 grams of marine shell, and six bones (with a total weight of 0.09 grams). Given the low density of cultural remains and the limited diversity in the assemblage, the site was interpreted as a day-use hunting location.

In 2001, a wildfire burned 1,016 acres in the project vicinity. A subsequent archaeological survey to take advantage of the increased surface visibility following the fire examined CA-SBA-1070, -1070E, and -1071. No gaps exceeding 50 meters were identified between the sites; so the three were grouped into a single complex (Mirro and Lebow 2003). As noted above, this site complex was designated CA-SBA-1070/1070E/1071.

No archaeological studies were completed at CA-SBA-1778 in conjunction with the Heritage Launch Program Demolition project because the site was adequately tested during studies for the MX missile project. Chambers Consultants and Planners (1984) recommended that the site was ineligible for the NRHP, and in December of 1998 the site was formally determined ineligible in consultation with the State Historic Preservation Office.

As discussed above, parts of the CA-SBA-1070/1070E/1071 complex were tested during investigations for the MX missile project (Chambers Consultants and Planners 1984), and Tetra Tech (1988:Table 3.2-1) indicates that sites in the complex were evaluated as eligible for the NRHP. However, none of the sites in the complex were formally determined eligible for the NRHP by Vandenberg AFB, and the previous investigations were inadequate by today's standards.

Therefore, given that part of the CA-SBA-1070/1070E/1071 site complex extends into the Atlas 576-F Launch Complex, Æ tested the site to evaluate its contribution to the San Antonio Terrace Archaeological District and to assess potential adverse effects from demolition of the buildings (Lebow et al. 2005). That effort included excavation of 40 shovel test pits and 10 test excavation units, with a total volume of 12.720 cubic meters. The site is comprised of 10 spatially distinct artifact concentrations, although radiocarbon analysis indicates that the site was occupied during a relatively brief interval between A.D. 1160 and 1630. Excavations yielded 1,919 flakes, 20 stone tools, 396 vertebrate specimens (385 considered cultural), 3,145.2 grams of marine shell, 25 fire-altered rocks, and 0.1 grams of asphaltum. Lithic tools include seven bifaces, 10 unpatterned flake tools, one projectile point, one core that was recycled into an abrader, and six ground stone fragments. It appears that some loci served as short-term residences while others functioned as locations for hunting and gathering resources. Because the site (CA-SBA-1070/1070E1071) contains data that can be used to address research issues related to subsistence and settlement systems, Æ opined that the site is a significant contributing element of the San Antonio Terrace Archaeological District (Lebow et al. 2005).

395-A Launch Facility

Buildings to be demolished in this facility include 1853, and 1874. These are part of the Titan 395-A Launch Complex built between 1958 and 1960 for the Titan I ICBM. The first launch was on 23 September 1961. Between 20 January 1962 and 1 May 1963, 12 Titan missiles were launched, primarily for research and development purposes. The launch emphasis then shifted and between 30 March 1963 and the end of March 1965, 10 Titan missiles had been launched as targets for the Army's Nike-Zeus anti-missile system. By that time the Air Force was phasing out the Titan I in favor of the Titan II and Minuteman ICBMs. The Titan 395-A Launch Complex was decommissioned and most of the useful and important equipment was removed. As a result, the site does not retain the integrity of its historic function and it is ineligible for the NRHP (McCullough and Nowlan 1997).

Background research identified two archaeological sites (CA-SBA-593 and -1929) and two isolated artifacts (VAFB-ISO-480 and VAFB-ISO-482) within 0.25 mile of the Titan 395-A Launch Complex. Both sites are part of the San Antonio Terrace Archaeological District and thus eligible for the NRHP (Tetra Tech 1988). However, none of the sites or isolated artifacts are within 200 meters of the facility. Background research also revealed that 29 archaeological studies have been completed within 1.0 mile of the Titan 395-A Launch Complex (Table C-13, Appendix C). Most of these studies were completed for the MX or Peacekeeper/Rail Garrison missile programs on the San Antonio Terrace.

Building 1895

Building 1895 is part of the Atlas 576-C Launch Complex built in 1959–1960 to launch the Atlas E ICBM. Only three missiles were launched from the complex—all in 1963—before the Air Force began to phase out the Atlas program in favor of the silo-based missiles. The facility was decommissioned and all useful equipment was removed. Consequently, Building 1895 does not retain the integrity of its historic function and is ineligible for the NRHP (McCullough and Nowlan 1997).

Background research revealed that two isolated artifacts (VAFB-ISO-080 and -089) are within 0.25 mile of Building 1895. However, both artifacts are more than 300 meters from the building. Three archaeological sites are present within the 0.25-mile radius (CA-SBA-1153, -1199, and -2161). All three sites are within the San Antonio Terrace Archaeological District (Tetra Tech 1988), but none are within 100 meters of Building 1895. Background research also determined that 22 archaeological studies have been completed within 1.0 mile of Building 1895 (Table C-14, Appendix C). Most of these studies were completed for the MX or Peacekeeper/Rail Garrison missile programs on the San Antonio Terrace.

The Vandenberg AFB geographic information system plots a fourth site, CA-SBA-599, about 60 meters from the building. However, this is a mapping error as CA-SBA-599 is actually located near the city of Orcutt, well off Vandenberg AFB. Due to the possibility that a site is actually located 60 meters from Building 1895 but was simply mislabeled, the plotted location was examined during investigations for the Heritage Launch Program Demolition project. No evidence of a site was found.

Communication Huts

Seven communication huts Buildings 1952, 1953, 1957, 1958, 1982, 1992, and 1995) scattered throughout the northern part of Vandenberg AFB are scheduled for demolition. None of these buildings were evaluated as significant during the Palmer (2000) or USACERL studies.

Building 1952 (RF Hut 1). Background research revealed that three archaeological sites (CA-SBA-3026, -3026, and -3294) and four isolated artifacts (VAFB-ISO-066, -800, -801, and -802) are within 0.25 mile of Building 1952. None of these resources are within 150 meters of the building. Background research also indicates that 11 archaeological studies have previously been completed within 1.0 mile of this hut (Table C-15, Appendix C).

Buildings 1953 and 1958 (Radio Frequency [RF] Huts 2 and 7). These two huts are in within 200 meters of each other and thus were grouped together for the background research. Fourteen previously completed archaeological sites are within 1.0 mile of the two buildings (Table C-16, Appendix C). Background research also identified five archaeological sites within 0.25 mile the huts, including CA-SBA-733, -939, -940, -2319, and -3036. Two isolated artifacts (VAFB-ISO-487 and -814) are also within 0.25 mile.

One of the archaeological sites, CA-SBA-940, is approximately 30 meters from RF Hut 7. Ursula Smith first recorded this site as a habitation site represented by a low density of artifacts, shellfish, and Monterey chert flakes. Artifacts observed on the surface include a basket hopper mortar, numerous mano fragments, and an anvil stone. The site's eligibility for the NRHP has not been formally evaluated.

Building 1982 (RF Hut 3). Background research indicates that 12 archaeological studies have been completed within 1.0 mile of Building 1982 (Table C-17, Appendix C). No isolated artifacts are recorded within 0.25 mile of the building, but seven archaeological sites are documented within that radius. These sites include CA-SBA-512, -513, -732, -941, -1853, -3038, and -3288.

Building 1982 is within CA-SBA-512; CA-SBA-513 and -941 are adjacent to CA-SBA-512 and form a large site complex. Schumacher first documented CA-SBA-512 in

1875 as an occupations site adjacent to the shore on low dunes. Little and Howe (1983) indicate that the site contained "a wealth of artifacts and burial goods, as well as a highly developed midden throughout". Schumacher, Ruth, and Lillard are reported to have excavated at the site. Cultural constituents identified at CA-SBA-512 include mortars, pestles, ornaments, olivella beads, steatite beads, a hopper mortar, limpet ornaments, an obsidian blade, a pelican wing bone whistle, a steatite mortar, asphaltum clods and lumps, bone needles, chert blade, a bone hair tube, an asphaltum lined basket, red ochre, manos, and comals. The NRHP-eligibility of CA-SBA-512 has not been formally evaluated.

Building 1995 (RF Hut 5). Nine archaeological studies have been completed within 1.0 mile of Building 1995 (Table C-18, Appendix C). Background research also revealed that seven archaeological sites are within 0.25 mile, including CA-SBA-759, -971, -972, -973, -1866, -2129, and -2456. None of these sites are within 75 meters of the building.

Building 1957 (RF Hut 8). Background research indicates that 13 archaeological studies are reported within 1.0 mile of Building 1957 (Table C-19, Appendix C). Five archaeological sites are documented within 0.25 mile of the building, including CA-SBA-733, -942, -2323, -3037, and -3039. None of these are within 75 meters of the hut. No isolated artifacts are documented within 75 meters of the building.

Building 1992 (RF Hut 9). Six archaeological studies have previously been completed within 1.0 mile of Building 1992 (Table C-20, Appendix C). Background research reveals that eight archaeological sites are within 0.25 mile, including CA-SBA-759, -970, -1866, -2128H, -2129, -2471, -3479, and -3480. A single isolated artifact (ISO-388) is also recorded within 0.25 mile of the building. This isolated artifact is shown on maps at the Central Coast Information Center but not in the Vandenberg AFB Base Comprehensive Plan GIS.

One archaeological site, CA-SBA-759, is within 25 meters of Building 1992. This site was first recorded by Spanne in 1971 as a pioneer cemetery and a low-density scatter of marine shell and flaked stone. In 1999, Palmer and Reeves re-recorded the site as the Point Sal Cemetery. It lies on a hilltop east of the Charles Clark homestead and surrounded by a barbed wire fence in a rectangular configuration approximately 100 feet east-west by 180 feet north-south. A monument of poured concrete and granitic rock is in the southeast corner of the fenced enclosure. The monument is inscribed with "In Memory of Pioneers Buried Here 1871–1888. Erected by Santa Maria Parlor No. 246 Native Daughters of the Golden West 1948." The site's eligibility for the NRHP has not been formally evaluated.

Building 20220

This 250,000-gallon staging tank was not identified as an important building during the Palmer (2000) or USACERL studies.

Background research indicates that one isolated artifact (VAFB-ISO-116) and four archaeological sites (CA-SBA-1087, -3109, -3125, -3138) are within 0.25 mile of the staging tank. None of these are within 100 meters of the tank or the security fence around the tank. Background research also found that 24 archaeological studies have been completed within 1.0 mile of the proposed demolition (Table C-21, Appendix C).

3.4. Hazardous Materials and Hazardous Waste Management

Hazardous materials and wastes are those substances defined as hazardous by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (42 U.S. Code [USC] 9601-9675), the Toxic Substances Control Act (TSCA) (15 USC 2601-2671), the Solid Waste Disposal Act as amended by the Resource Conservation and Recovery Act (RCRA; 42 USC 6901-6992), and Title 22 of the California Code of Regulations (CCR). In addition, federal and state Occupational Safety and Health Administration (OSHA) regulations govern protection of personnel in the workplace. In general, the definitions within these citations include substances that, because of their quantity, concentration, or physical, chemical, or infectious characteristics, may present substantial danger to public health (to workers), welfare, or the environment, when released into the environment.

3.4.1. Hazardous Materials Management

Hazardous materials potentially used during demolition projects are petroleum, oils and lubricants in demolition equipment and vehicles, solvents for paint abatement or equipment

cleaning, explosives for certain structural demolitions, and compressed gases for welding or cutting equipment.

Vandenberg AFB uses approximately 5,000 hazardous materials items to accomplish mission and mission support activities, with the hazard potential of the materials ranging across the spectrum of toxicity. Hazardous materials include items such as rocket fuels, pesticides, paints, batteries, and some cleaners. Organizations using hazardous materials on Vandenberg AFB must comply with California Business Plan requirements, and contractors must submit an EPP to 30 CES/CEV prior to starting work. Management of hazardous materials used on Vandenberg AFB follows procedures found in 30 SW Plan (30 SWP) 32-7086, *Hazardous Materials Management Plan* (HMMP). The base operates using a Hazardous Materials Pharmacy (HazMart) concept, wherein the HazMart maintains inventories of hazardous materials, whether purchased by the Air Force or its contractors. Before releasing hazardous materials to the user, HazMart staff ensures a copy of the Material Safety Data Sheet is available and verifies that the material is suitable for use on Vandenberg AFB. By providing handling and use information, Vandenberg AFB controls the potential misuse of hazardous materials, maintains an accounting of the types of hazardous materials used on the base, and accomplishes use and emissions reports as required by federal, state and local environmental regulations. In addition to Vandenberg AFB requirements, contractors operating on Vandenberg AFB are subject to all federal, state and local hazardous materials regulations, and are subject to inspection by a variety of federal, state and local regulatory agencies.

3.4.2. Hazardous Waste Management

Hazardous wastes potentially encountered from demolition projects could include ACM; LBP; PCB oils, coatings and electrical devices; smoke detectors; and Universal wastes such as fluorescent lamps, other electronic wastes; batteries; and mercury filled thermostats.

Management of hazardous waste at Vandenberg AFB complies with the RCRA Subtitle C (40 CFR Part 240-299) and with California Hazardous Waste Control Laws as administered by the California Environmental Protection Agency (Cal EPA) Department of Toxic Substances Control, under CCR Title 22, Division 4.5. These regulations require that hazardous wastes be handled, stored, transported, disposed of, or recycled according to defined procedures. The Vandenberg AFB *Hazardous Waste Management Plan* (HWMP; 30 SWP 32-7043A) outlines the procedures to be followed for hazardous waste management on Vandenberg AFB.

Contractors generating hazardous wastes in support of a government contract are required to follow federal, state and local laws and regulations, and use the Vandenberg AFB Generator ID Number to account for hazardous wastes generated. Because of the amount of hazardous waste generated per month under its Generator ID Number, Vandenberg AFB is classified as a large quantity, fully regulated generator, required to comply with all laws regulating the generation, storage, transportation, and disposal of hazardous waste. Vandenberg AFB employs a “cradle to grave” waste management approach. Generally, hazardous waste follows the 90-day accumulation rules as allowed by regulation, or is stored up to 270 days at authorized “satellite accumulation” points (SAPs). SAPs are located at the point of generation, and wastes may be stored until 55 gallons of hazardous waste, or one quart of extremely or acutely hazardous waste is accumulated. When the SAP limit is reached, the waste is transferred in a properly labeled Department of Transportation approved container from its point of origin to the Consolidated Collection Accumulation Point (CAP) at Building 6830, or to a permitted off-site treatment storage or disposal facility. Appendix 4 of the Vandenberg AFB HWMP provides detailed procedures for hazardous waste accumulation. Since the demolition contractor would use the Vandenberg AFB Generator Identification Number, the contractor must comply with the Base HWMP. A base contractor operates the Consolidated CAP for the Air Force and is responsible for receiving waste, inspecting waste containers for proper storage and labeling, and preparing Department of Defense (DOD) Form 1348-1A, issue/turn-in documentation, required to fund disposal of hazardous waste. Hazardous waste is then removed from Vandenberg AFB under hazardous waste manifest and shipped off-site for final disposal.

3.4.2.1. Asbestos Abatement Management

The U.S. EPA and OSHA define ACM as any material or product that contains greater than one percent asbestos. The California Occupational Safety and Health Administration (Cal OSHA) defines asbestos-containing construction material as any manufactured construction material that contains more than 0.1% asbestos (CCR Title 8, Section 1529, Article 4). Air Force Instruction (AFI) 32-1052, *Facilities Asbestos Management*, establishes requirements and assigns responsibilities to incorporate facility asbestos management principles and practices into all Air Force asbestos programs. The AFI ensures compliance with the U.S. EPA National Emission Standards for Hazardous Air Pollutants (40 CFR 61.140) and the OSHA Asbestos Construction Standards (29 CFR 1926.58). The Vandenberg AFB *Asbestos Management Plan* (30 SWP 32-1052A), and the *Asbestos Operating* Plan (30 SWP 32-1052B) are Vandenberg AFB's primary documents for implementing the objectives of facility asbestos management, and ensure the base complies with applicable federal, state, and local regulations. Procedures for asbestos management are outlined in the Vandenberg AFB Asbestos Management Plan (AMP).

Notification of demolition of load-bearing structures must be made to the Santa Barbara County Air Pollution Control District (APCD) no later than 10 working days prior to the start of the project even if there is no asbestos present in the facility. A copy of the notification must be sent to and approved by the 30 CES/CEV Compliance Section (30 CES/CEVC) Asbestos Program Manager before submitting to the APCD. All projects must be approved by 30 CES/CEVC prior to the start of work. Conditions for project approval include requirements for training, building surveys, and project management. Persons contracted to perform asbestos abatement, building surveys, and project management must be certified in accordance with Section 341.15, Article 2.6, Chapter 3.2, of Title 8 CCR.

All demolition projects must incorporate an asbestos survey into the design process. Demolition work cannot occur without a facility survey. Many facilities on Vandenberg AFB have asbestos survey information on file in the 30 CES/CEVC offices (Table 3-5). If additional surveys are required, the surveys must be conducted by a state certified asbestos consultant or an asbestos site surveillance technician. Sampling and surveys are conducted in accordance with 40 CFR Part 763. Detailed demolition contract requirements would include building-specific asbestos abatement specifications; completion of an up-to-date asbestos survey for each specific facility, including maps, drawings, or sketches indicating the exact location of the ACM; and a requirement to obtain demolition permits. Contract provisions would also include the requirement to notify the APCD and all other regulatory agencies of any revisions in the project design. The 30 CES/CEVC Asbestos Program Officer is contacted to schedule pre-abatement and post-abatement inspections.

3.4.2.2. Lead-Based Paint Management

The U.S. EPA and Cal EPA test for and regulate wastes exhibiting the characteristic of toxicity in different manners. Both agencies test metal-bearing wastes for toxicity based on the potential for leaching of metals. The U.S. EPA uses the Toxicity Characteristic Leaching Procedure, and sets the Threshold Limit Value, also named Maximum Concentration of Contaminant for the Toxicity Characteristic, for lead leachate at 5.0 milligrams per liter (mg/L). Cal EPA regulates wastes for toxicity using the Waste Extraction Test (WET) to determine the amount of extractable substance in a waste. Appendix II of Title 22 of the CCR, Division 4.5, Chapter 11, describes how and when the WET procedures are used. For lead and lead compounds the Total Threshold Limit Concentration (TTLC) is 1,000 milligrams per kilogram (mg/kg) and the Soluble Threshold Limit Concentration is 5.0 mg/L. Based upon the determination of metals toxicity, the California Health and Safety Code Section 25141.5(b) (3) may allow the disposal of wastes, which are hazardous **only** due to exceeding applicable TTLCs for inorganic constituents, to be disposed of in a Class I, II or III non-hazardous waste disposal unit provided certain conditions are met.

Many of the buildings on Vandenberg AFB constructed before 1978, and especially those constructed before 1960, contain quantities of LBP. The Vandenberg AFB *Lead-Based Paint Management Plan* (30 SWP 32-1002) provides specific direction in LBP management. The Lead-Based Paint Management Plan (LBPMP) contains strategies to identify, evaluate, and eliminate lead, pursuant to LBP standards; protect facility occupants and workers from LBP hazards; and properly dispose of lead-containing waste.

Table 3-5.
Results of asbestos surveys at buildings proposed for demolition.

ASBESTOS SURVEY COMPLETED				ASBESTOS SURVEY NOT COMPLETED	
Property Number	**Survey Results**	**Property Number**	**Survey Results**	**Property Number**	**Comments**
98	No indication	1201	Positive indications	702	
99	No indication	1202	Positive indications	711	
470	No indication	1204	Positive indications	713	
480	No indication	1205	Positive indications	716	
484	Positive indications	1209	Positive indications	719	
488	Positive indications	1537	No indication	722	
535	Positive indications	1538	No indication	726	
714	No indication	1539	No indication	729	
715	Positive indications	1783	Positive indications	739	Suspected
717	No indication	1788	Positive indications	746	
725	No indication	1823	Positive indications	786	
733	Positive indications	1825	Positive indications	1200	Suspected
734	Positive indications	1835	Positive indications	1505	
736	Positive indications	1836	Positive indications	1795	
737	Positive indications	1853	Positive indications	1830	Suspected
738	Positive indications	1874	Positive indications	1861	Suspected
768	Positive indications	1875	Positive indications	1935	Suspected
946	No indication	1895	Positive indications	20220	

Demolition projects on Vandenberg AFB include LBP surveys and sampling, as required. These surveys include risk assessment to define the source and extent of lead exposure hazards and review of data from LBP testing and bulk or x-ray fluorescence testing for non-priority buildings.

3.4.2.3. Polychlorinated Biphenyls and Dioxins

PCBs are occasionally found in oils, coatings, transformers, older fluorescent lighting ballasts, and electrical devices or appliances with PCB capacitors. PCB production in the United States ceased in 1997. PCBs are regulated under the TSCA (40 CFR 761; Title 22 of the CCR) and the U.S. EPA "PCB Final Ruling" (50 Federal Register [FR] 29172 [July 17, 1985]).

Dioxins, like PCBs belong to a family of toxic chemicals that share similar chemical structure and a common mechanism of toxic action. This family includes seven of the polychlorinated dibenzo dioxins (PCDDs), ten of the polychlorinated dibenzo furans (PCDFs), and twelve of the PCBs. PCDDs and PCDFs are not commercial chemicals but are trace level unintentional byproducts of most forms of combustion (U.S. EPA, *Persistent Bioaccumulative and Toxic Chemical Program*). During the demolition of buildings, dioxins are likely to be encountered in areas where PCBs may have been used, where structures may have been involved in fires, or where deposition of soot may have occurred as the result of combustion. Materials contaminated by or containing any level of PCBs, dioxins, and or furans, cannot be accepted for recycling or disposal at the Vandenberg AFB Sanitary Landfill.

3.4.3. Installation Restoration Program

Management Guidance for the United States Air Force Environmental Restoration Program (U.S. Air Force Environmental Restoration Program, February 2003), states that

the mission of the Air Force Environmental Restoration Program is the execution of Air Force responsibilities under the Defense Environmental Restoration Program, CERCLA, the corrective action provisions of the RCRA, and other federal environmental laws. The local program for each Air Force installation is referred to as the IRP. The IRP is intended to clean-up past disposal and spill sites on Air Force installations nationwide. Investigations conducted under IRP identify IRP sites, where proof exists of past hazardous material releases to the environment; areas of concern (AOCs), where potential past hazardous materials releases are suspected; and Areas of Interest (AOIs), defined as areas with the potential for use and/or presence of a hazardous substance. The Air Force Cleanup Program budget consists of three components: IRP, other Hazardous Waste operations, and Building Demolition and Debris removal (AFI 32-7001, *Environmental Budgeting*).

Since the demolition contractor would implement actions on or near Vandenberg AFB IRP sites, AOCs, and AOIs (Figures 3-2A and 3-2B), certain demolition actions may encounter contaminated soils or sites being managed under the program, even if demolition actions are anticipated to be primarily at or above current grade level.

3.5. Human Health and Safety

All deconstruction and demolition activities and facility operations and maintenance on Vandenberg AFB are subject to the requirements of the federal OSHA, and Air Force Occupational Safety and Health (AFOSH) regulations. Moreover, California OSHA (Cal OSHA) has jurisdiction over non-federal operations south of Honda Ridge Road on South Vandenberg AFB.

The affected environment for Health and Safety is the regulatory environment for health and safety issues established to minimize or eliminate potential risk to the general public and personnel involved in the demolition and abandonment of buildings.

Relevant health and safety requirements include industrial hygiene and ground safety. Industrial hygiene is the joint responsibility of 30 SW/SE, Bioenvironmental Engineering, and contractor safety departments. Responsibilities include monitoring of exposure to workplace chemicals and physical hazards, hearing and respiratory protection, medical monitoring of workers subject to chemical exposures, and oversight of all hazardous or potentially hazardous operations. Ground safety is the responsibility of 30 SW Safety and includes protection from hazardous situations and hazardous materials.

The Proposed Action would involve deconstruction and demolition activities where workers would potentially be exposed to conditions that could adversely impact their health and safety:

- Hazardous materials, primarily petroleum, oil and lubricants (POLs), would be used for operating heavy equipment under the Proposed Action. The potential exists for unexpected releases of these POLs, which would generate hazardous waste.
- ACM, LBP, PCBs and dioxins would be abated prior to any deconstruction or demolition activities. Therefore, these hazardous materials would not pose a health and safety issue to workers. The handling of these hazardous materials is discussed in detail in Section 3.4 of this PEA.
- The demolition contractor would transport hazardous material used in or resulting from the Proposed Action. A permitted hazardous waste hauler would transport hazardous waste. The transportation of these materials is discussed in detail in Section 3.4 of this PEA.

Because of the above conditions, the potential exists for persons participating in the demolition activities to become exposed to hazardous materials and hazardous waste. In addition to these more obvious risks to human health and safety, the following, more mundane, physical features, which have the potential to be present in the vicinity of the buildings proposed for demolition or abandonment, also have the potential to adversely impact the health and safety of the site workers:

- Physical hazards including traffic in the roads, holes and ditches, uneven terrain, sharp or protruding objects, slippery soils or mud, and unstable ground.
- Biological hazards such as animals (insects, spiders, and snakes), and disease vectors (ticks and rodents).

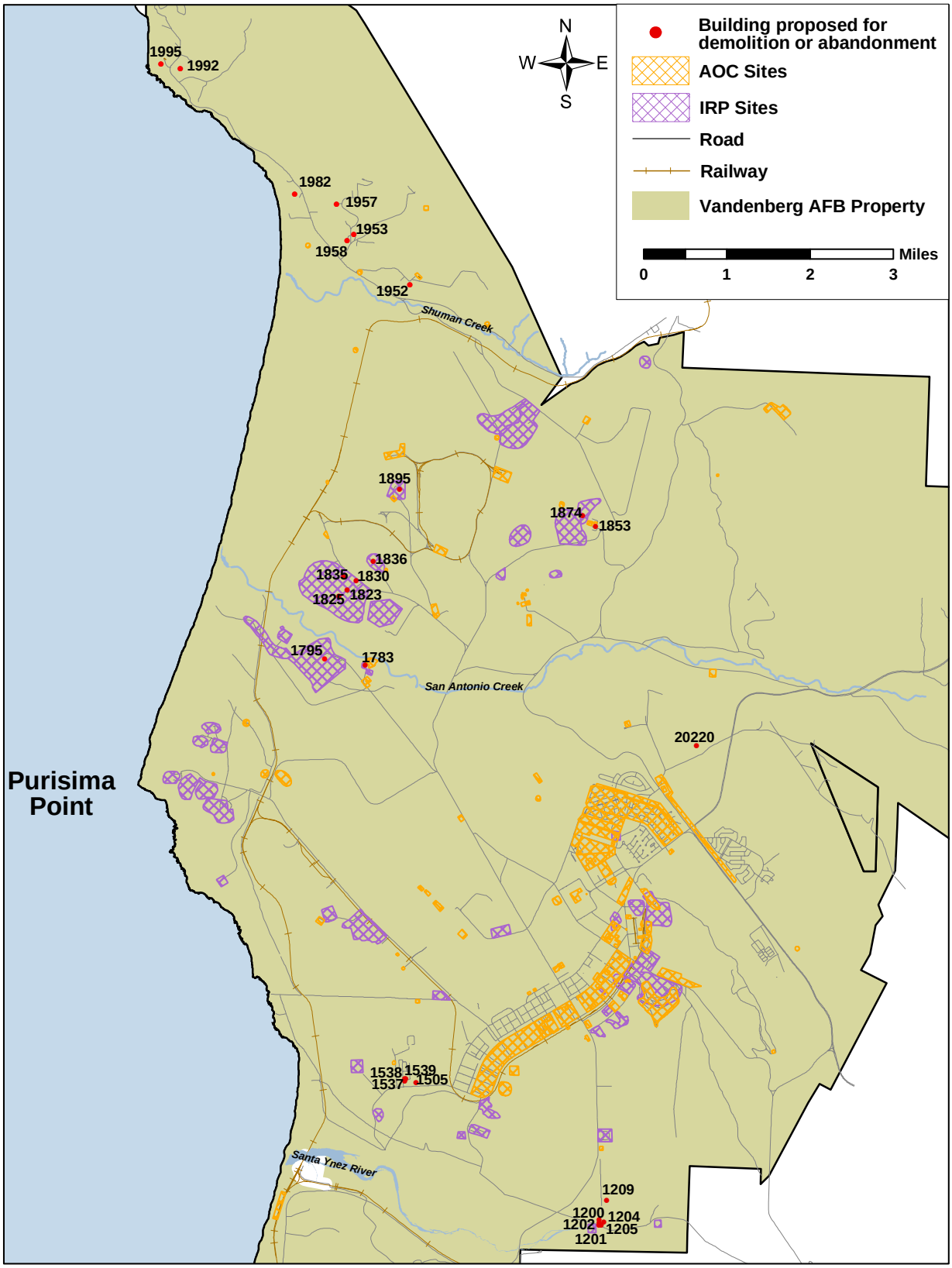

Figure 3-2A. IRP and AOC sites on North Vandenberg AFB.

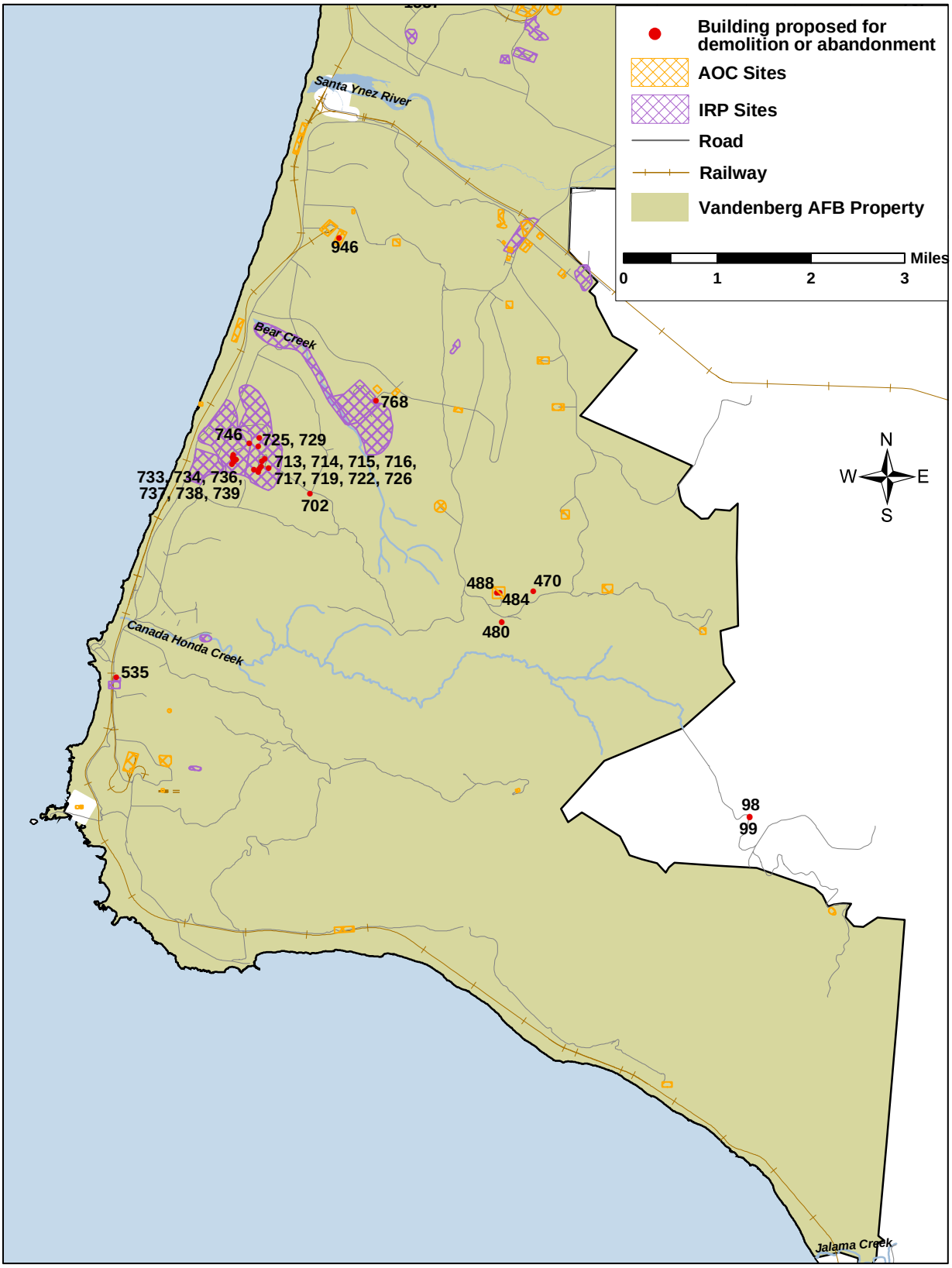

Figure 3-2B. IRP and AOC sites on South Vandenberg AFB.

3.5.1. Unexploded Ordnance

Many areas on Vandenberg AFB were used as ordnance training ranges. Since ordnance can be found almost anywhere on base, the Explosive Ordnance Disposal Flight (EOD) must coordinate on all demolition projects. According to EOD guidance, if ordnance is found on-site, it should not be disturbed. Workers in the vicinity must be alerted to the danger and directed away from it, and EOD must be contacted.

3.5.2. Noise

The Noise Control Act (NCA; 42 USC 4901 *et seq.*) sought to limit the exposure and disturbance that individuals and communities experience from noise. It focuses on surface transportation and construction sources, particularly near airport environments. The NCA also specifies that performance standards for transportation equipment be established with the assistance of the Department of Transportation. Section 7 of the NCA regulates sonic booms and gave the Federal Aviation Administration regulatory authority after consultation with the U.S. EPA. In addition, the 1987 Quiet Community amendment gave state and local authorities greater involvement in controlling noise.

Noise is often defined as unwanted sound that can interfere with normal activities or otherwise diminish the quality of the environment. Depending on the noise level, it has the potential to disrupt sleep, interfere with speech communication, or cause temporary or permanent changes in hearing sensitivity in humans and wildlife. Noise sources can be continuous (e.g., constant noise from traffic or air conditioning units) or transient (e.g., a jet overflight or an explosion) in nature. Noise sources also have a broad range of frequency content (pitch) and can be nondescript, such as noise from traffic or be specific and readily definable such as a whistle or a horn. The way the acoustic environment is perceived by a receptor (animal or person) is dependent on the hearing capabilities of the receptor at the frequency of the noise, and their perception of the noise. (URS 1986)

The amplitude of sound is described in a unit called the decibel (dB). Because the human ear covers a broad range of encountered sound pressures, decibels are measured on a quasi-logarithmic scale. The dB scale simplifies this range of sound pressures to a scale of zero to 140dB and allows the measurement of sound to be more easily understood.

There are many methods for quantifying noise, depending on the potential impacts in question and on the type of noise. One useful noise measurement in determining the effects of noise is the one-hour average sound level, abbreviated L_{eq1H}. The L_{eq1H} can be thought of in terms of *equivalent* sound; that is, if a L_{eq1H} is 45.3dB, this is what would be measured if a sound measurement device were placed in a sound field of 45.3dB for one hour. The L_{eq1H} is usually A-weighted unless specified otherwise. A-weighting is a standard filter used in acoustics that approximates human hearing and in some cases is the most appropriate weighting filter when investigating the impacts of noise on wildlife as well as humans. Examples of A-weighted noise levels for various common noise sources are shown in Table 3-6.

Table 3-6.
Comparative A-weighted sound levels.

Noise Level	Common Noise Levels	
(dBA)	Indoor	Outdoor
100 – 110	Rock band inside New York subway	Jet flyover at 304 meters
90 – 100	Food blender at one meter	Gas lawnmower at one meter
80 – 90	Garbage disposal at one meter	Diesel truck at 15 meters; noisy urban daytime
70 – 80	Shouting at one meter; vacuum cleaner at three meters	Gas lawnmower at 30 meters
60 – 70	Normal speech at one meter	Commercial area heavy traffic at 100 meters
50 – 60	Large business office; dishwasher next room	
40 – 50	Small theater or large conference room (background)	Quiet urban nighttime
30 - 40	Library (background)	Quiet suburban nighttime
20 - 30	Bedroom at night	Quiet rural nighttime
10 - 20	Broadcast and recording studio (background)	
0 – 10	Threshold of hearing	

Another useful acoustical metric for describing sound events is the A-weighted sound exposure level (SEL). The A-weighted SEL is the total sound energy in a sound event *if that event could be compressed into one (1) second.* In essence, SEL is an average sound level that is condensed into one-second. This provides a time-normalized metric and allows for analysis of events with different durations. As an example, an F-16 aircraft overflight (85% full power, altitude 210 feet, speed of 443 knots) was measured to have an A-weighted SEL of 113.1dB (Berry et al. 1991).

The "peak sound level" is the greatest instantaneous sound level reached during a sound event. Peak levels also have various frequency weightings applied to them. Peak levels, though useful in some cases, can often be misleading. It can occur that a single peak in a complex waveform can be substantially greater than the majority of a sound event. Therefore, peak levels should always be presented along with one or more of the metrics described above to better describe the sound event. An unweighted peak sound level is simply the peak sound level with no frequency weighting applied.

Existing noise levels on Vandenberg AFB are generally quite low due to the large areas of undeveloped landscape and relatively sparse noise sources. Background noise levels are primarily driven by wind noise; however, louder noise levels can be found near industrial facilities and transportation routes. Rocket launches and aircraft over flights create louder intermittent noise levels. On Vandenberg AFB, general ambient L_{eq1H} measurements have been found to range from around 35 to 60dB (Thorson et al. 2001). Most demolition activities associated with the Proposed Action would generate relatively continuous noise throughout the various implementation periods for each building. However, explosive demolition events would generate transient noise.

3.6. Land Use and Aesthetics

This section addresses the setting, existing land uses, and aesthetics of the project areas for the Proposed Action and alternatives. Implementing either the Proposed Action or any of the alternatives would not change the surrounding land uses.

3.6.1. Setting

Vandenberg AFB comprises a total of 99,099 acres in northern Santa Barbara County. The Base is divided into two areas, known as North Vandenberg AFB and South Vandenberg AFB, by State Highway 246 (West Ocean Avenue at this juncture). North Vandenberg AFB contains the urbanized cantonment area, which includes administrative, industrial, and residential uses. Space launch, missile test, telemetry, and tracking facilities occur on both North and South Vandenberg AFB. North Vandenberg AFB, north of San Antonio Creek, and much of South Vandenberg AFB is open land set aside as security or safety buffer zones.

Open space accounts for approximately 90% (88,260 acres) of the total land area on Vandenberg AFB. This open space, when topography and natural resource management allows, is outleased to the U.S. Federal Penitentiary at Lompoc for cattle grazing and agricultural use (approximately 23,500 acres). Other land uses on Vandenberg AFB include administrative, airfield, Air Education Training Command, community service and commercial, housing, industrial, launch operations, medical, outdoor recreation, and water/coastal.

Development on Vandenberg AFB is regulated through the Vandenberg AFB General Plan (USAF 2004), various U.S. Air Force safety regulations, and several state and Federal regulations aimed at preserving the cultural and environmental resources on Vandenberg AFB (see Table 1-1, Chapter 1). Guidance for land use planning is in AFI 32-7062, *Air Force Base Comprehensive Planning*.

Visual resources at Vandenberg AFB include natural and man-made features. The Base encompasses 35 miles of coastline, including rocky headlands, coastal bluffs, and sandy beaches. A large dune complex, rolling hills, erosional valleys, and a broad sweeping mesa are found on North Vandenberg AFB while the Transverse Ranges are a major mountain feature on South Vandenberg AFB. Man-made features on base include the airfield, launch pads, residential development, industrial facilities, and other structures typical of a military installation. Man-made elements are scattered throughout the base. Space and missile launch complexes are located near the coast, and radar towers, telemetry stations, and supporting utilities are distributed widely. Visual resource sensitivity is

dependent on the type of user, the amount of use, and viewer expectations. Because the mission of the base is the development of U.S. space and missile programs, viewers are familiar with the existing man-made features on the base associated with these programs.

Base boundaries begin with the Casmalia Hills to the north and the Santa Ynez Mountains and Sudden Flats to the south. Between these two ranges are the broad and generally flat areas of San Antonio Terrace, Burton Mesa, and Lompoc Terrace on which the majority of Vandenberg AFB missions occur.

The surface topography within Vandenberg AFB is varied, with the highest topographic relief being in the southern parts of the property. The generally moderate slopes of the Casmalia Hills rise to over 1,300 feet and, to the south, the much steeper canyon slopes of Tranquillion Mountain represent a dramatic backdrop to the southern coastal flats.

The buildings proposed for demolition or abandonment range widely in size and structure type and are scattered throughout north and south Vandenberg AFB (Figures 2-1A and 2-1B, Chapter 2). Many of these buildings are not currently in use, which has allowed their condition to deteriorate. Due to the number of sites, the visual settings are described by North and South Base rather than by individual sites.

Vandenberg AFB is made up of a mixture of vegetation types. The dominant vegetation types are central coastal scrub, coastal dune scrub, chaparral, grassland, and oak woodland. Other vegetation types include riparian woodland, dune swale, bishop pine forest, freshwater marsh, estuarine, coastal salt marsh, cropland, and exotic vegetation (USAF 2003). Watersheds on south Vandenberg AFB include Canada Honda Creek and smaller intermittent streams, which flow in both a northwesterly and southwesterly direction to the Pacific Ocean.

3.6.2. Coastal Zone Management

Federal activity in, or affecting, a coastal zone requires preparation of a Coastal Zone Consistency Determination or a Negative Determination, in accordance with the federal Coastal Zone Management Act (CZMA) of 1972. The California Coastal Zone Management Program was formed through the California Coastal Act (CCA) of 1972. The Air Force is responsible for making final coastal zone consistency determinations for its activities within the state. The California Coastal Commission reviews federally authorized projects for consistency with the California Coastal Zone Management Program.

On Vandenberg AFB, the coastal zone extends inland from approximately 0.75 mile at the northern boundary to 4.5 miles at the southern end of the base. As depicted in Figures 2-1A and 2-1B and listed in Table 3-7, some of the buildings proposed for demolition or abandonment are located within the Coastal Zone, thus their demolition or abandonment would be subject to consistency with the CZMA.

Table 3-7.
Buildings proposed for demolition or abandonment located within the California Coastal Zone at Vandenberg AFB.

Buildings on North Vandenberg AFB		Buildings on South Vandenberg AFB	
1783	1958	535	729
1795	1982	713	733
1823	1992	714	734
1825	1995	715	736
1830		716	737
1836		717	738
1895		719	739
1952		722	746
1953		725	946
1957		726	

3.7. Solid Waste Management

In 1989, the California Integrated Waste Management Act (Assembly Bill 939) mandated a 50% reduction in the quantity of solid waste disposed of in California landfills. The 50% reduction was to be accomplished by January 1, 2000,and was measured against a 1990 baseline. In 1994, the Air Force mandated similar waste diversion requirements, using a 1992 baseline. The most recent solid waste diversion requirements applicable to this PEA were enacted through California Senate Bill 1374, *Solid Waste: Construction and Demolition Waste Materials: Diversion Requirements Model Ordinance.* On March 1, 2004, the California Integrated Waste Management Board (CIWMB) promulgated a model ordinance for local agencies to follow for implementing a 50 to 75% diversion of construction and demolition (C&D) debris waste materials from landfills. Currently, the local enforcement agency, the Santa Barbara County Environmental Health Services Division, has not promulgated its final model ordinance. A locally adopted diversion ordinance would affect requirements and operations at the Vandenberg AFB Sanitary Landfill (Base Landfill) because the Federal Facilities Compliance Act waived sovereign immunity with respect to California solid waste programs, and Vandenberg AFB is within the Santa Barbara County waste shed.

30 CES/CEV will require a minimum 85 percent diversion rate by weight over all for C&D materials generated by these efforts. Inert materials are highly recyclable with proper pre-planning for segregation and on-site management. Steel, non-chemically treated wood, concrete, waste soil, and asphalt generated as a result of the demolition actions would be expected to have a diversion rate higher than 85 percent. Typically, such materials are 100 percent divertible with proper planning and practices. Vandenberg AFB policy is that C&D materials will be managed on Vandenberg AFB to the maximum extent possible. Efforts to minimize capacity consumption of off-base Santa Barbara County recyclers will be incorporated into all project planning. No off-base disposal of solid waste within Santa Barbara County is authorized for these demolition efforts.

3.7.1. Vandenberg AFB Sanitary Landfill

The Base Landfill is a 172 acre unlined Class III waste management facility (Figure 3-3). The RCRA Subtitle D disposal footprint is 46 acres (that part of the facility that has received or is receiving wastes and that has not been closed in accordance with 40 CFR Part 258). The Base Landfill does not charge a tipping fee to authorized base organizations, base contractors, and residents of military family housing (MFH) and dormitories. A part of the Lompoc waste shed, the Federal Correction Institute and United States Penitentiary, use the Base Landfill for disposal of their wastes and are charged $32.50 per ton for solid waste disposal. Commercial space operations with leased facilities on Vandenberg AFB do not have access to the Base Landfill, and make their own arrangements for solid waste management.

Through a 30 SW contract, a commercial contractor collects refuse and recyclables generated on base and operates the Base Landfill. Operational oversight of the contractor is provided by the 30 CES Operations Flight, with environmental oversight provided by the 30 CES/CEV. The contract includes pre-arranged collection routes for both recycled material and refuse in the base industrial and MFH areas. The contractor provides all personnel, equipment, tools, materials, supervision, and other items and services necessary to meet contract requirements. Collected refuse is disposed of in the Base Landfill. Recyclable materials are prohibited from landfill disposal and are taken to off-base recovery facilities. Special projects, such as the proposed demolition project, are authorized to use the Base Landfill if their contract with the Air Force so stipulates. Project contractors make arrangements to use the Base Landfill but are required to segregate and transport their solid wastes to designated disposal areas within the landfill.

The base operates the landfill pursuant to Solid Waste Facility Permit (SWFP) #42-AA-0012 issued on January 10, 2000, by the CIWMB, and Waste Discharge Requirement (WDR) Order No. R3-2004-0151 issued by the RWQCB on November 19, 2004. As part of the required January 2005 SWFP review, Vandenberg AFB submitted an application to renew and revise its permits for the Base Landfill. The primary reason for the revision request is the result of changes in

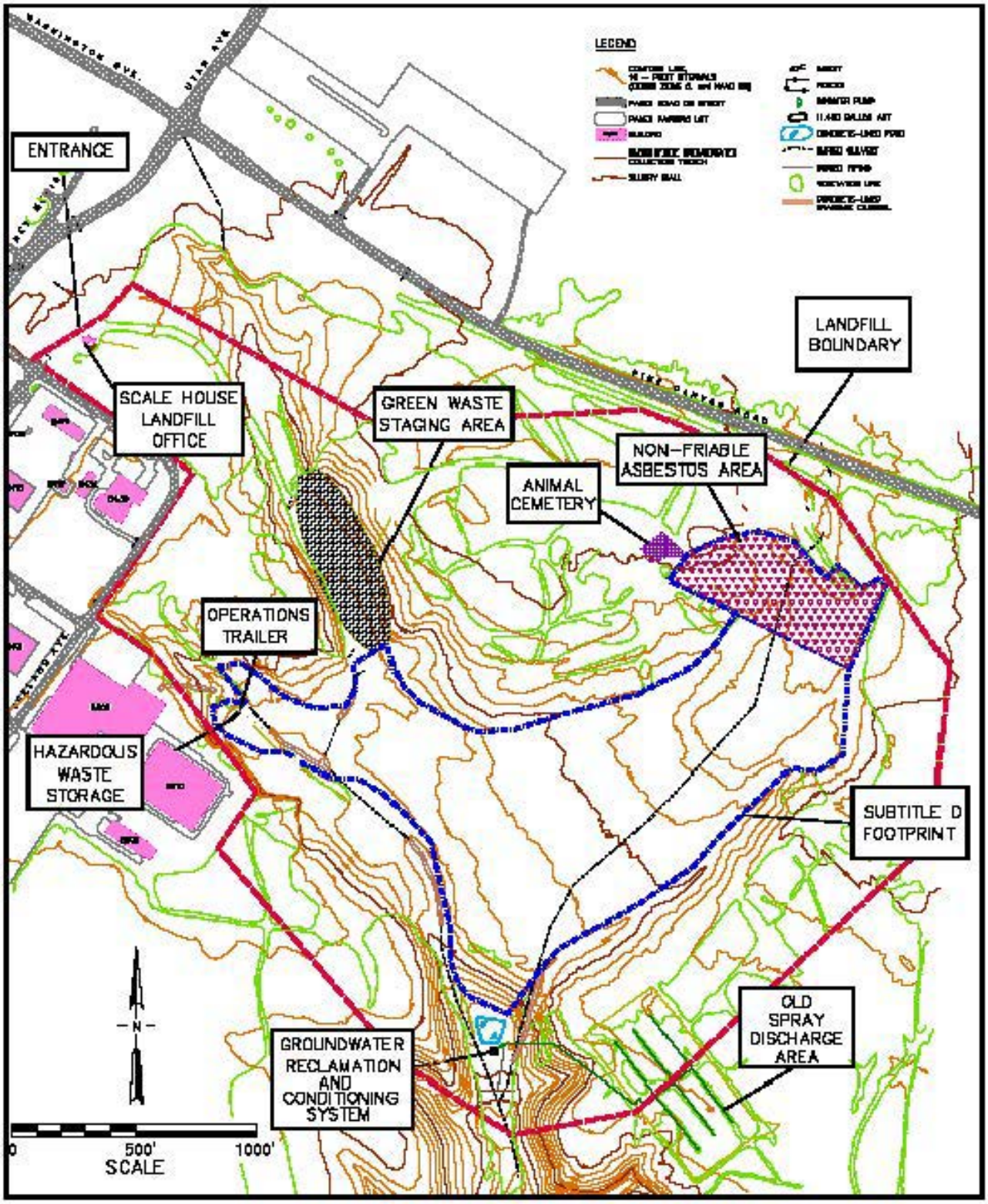

Figure 3-3. Vandenberg AFB Sanitary Landfill (figure extracted from 30 SWP 32-7042, *Solid Waste Management Plan*).

landfill capacity. Under the current permit the capacity is stated as 2,464,000 cubic yards (May 1997); the renewal application lists remaining site capacity as 2,179,000 cubic yards (December 2004). Pursuant to requirements of the existing permits and other federal and state regulations, the Base Landfill has groundwater monitoring wells, a landfill gas monitoring procedure, and leachate and run-on/run-off control systems.

As shown in Figure 3-3, the Base Landfill has several designated disposal areas: The active face of the landfill; a non-friable asbestos disposal area; an animal cemetery, and a wood yard. The landfill can accept 374 tons per day of non-hazardous general municipal solid waste, 18 tons per day of non-hazardous-separated or commingled recyclables, and eight tons/day of non-hazardous wastes as allowed in Section 14 of the permit. Section 14 items include: non-friable asbestos; small animal carcasses; separated C&D debris; wood or green wastes to be chipped for recycling or alternate daily cover (ADC); waste tires to be hauled off-site for recycling or incineration; and properly treated medical waste as defined in the California Health and Safety Code, Chapter 8, Section 117600, et seq. (medical wastes are not accepted and are managed under separate contract). The Base Landfill is prohibited from accepting: liquid wastes, including grease; sewage sludge and septic tank pumping; burning waste; hot ashes; untreated medical waste; non-hazardous waste requiring special handling; designated waste; hazardous waste; radioactive waste; and treated wood waste.

The estimated remaining capacity of the Base Landfill (approximately 2,179,447 cubic yards) is based upon a waste to cover ratio of 4:1, and an in-place waste density of 1,000 pounds per cubic yard (Vandenberg AFB Application for Solid Waste Facility Permit/Waste Discharge Requirements, March 30, 2005). Table 3-8, derived from the CIWMB *2003 California Landfill Tonnage Report*, illustrates how Vandenberg AFB compared to other active landfills within Santa Barbara and San Luis Obispo counties. Although permitted for a peak daily tonnage of 400 tons, the average daily tonnage is approximately 35 tons per operating day.

3.7.2. Construction and Demolition Debris

Vandenberg AFB construction and demolition projects generally originate from 30 CES program management and planning requirements. Projects for new construction range from multi-story administrative buildings to space launch complexes. Demolition projects range from removal of World War II wooden structures to MFH replacement, to demolition of obsolete launch complexes and facilities. The debris from these projects includes, but is not limited to, concrete, asphalt, wood waste, dry wall material, and glass. There are different processes established for handling and disposing of C&D debris.

Debris from new construction is typically uncontaminated and is reused or recycled whenever feasible. Material segregation and storage are also less of a problem with new construction than with demolition. Debris from demolition projects is sometimes less amenable to reuse or recycle because, based on facility age, the structure may be painted with LBP, contain ACM, and have treated woods in structural and finishing materials. This debris may have to be

Table 3-8.
2003 California Landfill Tonnage Report.

SWIS ID	Site Name	County	Year Total
42-AA-0011	Foxen Canyon	Santa Barbara	10,815
42-AA-0012	***Vandenberg***	***Santa Barbara***	***7,751***
42-AA-0015	Tajiguas	Santa Barbara	220,493
42-AA-0016	Santa Maria	Santa Barbara	131,607
42-AA-0017	Lompoc	Santa Barbara	44,204
40-AA-0001	Paso Robles	San Luis Obispo	49,571
40-AA-0004	Cold Canyon	San Luis Obispo	177,458
40-AA-0008	Chicago Grade	San Luis Obispo	75,283

managed as hazardous waste. In addition, the federal government has specific rules that apply to the transfer of government property to local jurisdictions or commercial enterprises (U.S. Department of Housing and Urban Development 2000). Demolition projects must also overcome cost differentials wherein it may be less expensive to demolish a structure than to deconstruct or dismantle it. Cost differentials between tipping fees and costs associated with reuse or recycling also influence disposal decisions.

Vandenberg AFB has a resident Defense Reutilization and Marketing Office (DRMO) to accomplish reutilization, transfer, donation, and sale (RTDS) of excess property. The first three elements of this process (reutilization, transfer and donation) are internal to the federal government or to government-approved entities such as state or local government agencies. The final step (sale) makes property available to commercial enterprises and the general public.

3.7.3. Pollution Prevention

As previously stated, both the State of California and the Air Force have mandated a reduction in the quantity of solid waste disposed of in landfills. The Pollution Prevention Act (PPA) of 1990 refocused the national approach to environmental protection toward pollution prevention (P2). Implementing the up-coming Air Force Environmental Management System (EMS) by December 2005 will carry P2 a step further toward mission sustainability principles. The P2 program at Vandenberg AFB is evolving to promote EMS and provide a policy aimed at achieving 30 SW EMS objectives and targets, through documented practices, procedures, and operational requirements. Vandenberg AFB will continue to implement EMS and its associated P2 program elements by following the P2 hierarchy:

- Reduce (source reduction to prevent the creation of wastes);
- Reuse (keep item or material for its intended purpose);
- Recycle (use item or material for some other beneficial purpose);
- Disposal (in an environmentally compliant manner, only as a last resort).

3.8. Transportation

For the purpose of this PEA, the area of influence for transportation would be the combination of highway, arterial, and local roads that provide service to Vandenberg AFB and the project areas. Exiting roadway conditions are evaluated based on roadway capacity and traffic volume. The capacity, which reflects the ability of the network to serve the traffic demand of a roadway, depends on the roadway width, number of lanes, intersection control, and other physical factors. Traffic volumes can be reported as the number of vehicles averaged over a daily period (Average Daily Traffic or ADT) or an annual period (Annual Average Daily Traffic or AADT). Peak-hour volume (PHV) is defined as the highest volume of traffic in a 24-hour period that is recorded on a roadway or intersection during a one-hour period.

The performance of a roadway is generally expressed in terms of Level of Service (LOS). As shown in Table 3-9, the LOS scale ranges from A to F, with each level defined by a range of volume-to-capacity (V/C) ratios. LOS A, B, and C are considered good operating conditions with minor to tolerable delays experienced by motorists. LOS D represents below-average conditions. LOS E reflects a roadway at maximum capacity, and LOS F represents traffic congestion.

As shown in Figure 1-1 (Chapter 1 of this PEA), the main access route to Vandenberg AFB is U.S. Highway 101 (US 101). US 101 is the coastal four-lane divided freeway connecting Northern California to Southern California. The Vandenberg AFB connections to US 101 are U.S. Highway 1 (US 1), State Route 135 (SR 135), and State Route 246 (SR 246). US 1 is mostly a two lane rural highway with the portion bordering Vandenberg AFB a four-lane rural expressway. SR 135 and SR 246 are mostly two-lane undivided highways with four-lane rural expressway portions.

North Vandenberg AFB is accessible from three gates; Santa Maria Gate, Solvang Gate, and Lompoc Gate (see Figures 2-1A and 2-1B in Chapter 2). US 1 services the Santa Maria Gate, while SR 246 services the Solvang Gate, which in Lompoc is also known as Ocean Avenue. Currently truck access to North Vandenberg AFB and the base cantonment area is through the Lompoc Gate and the Solvang Gate. Santa Lucia Canyon Road, a two-lane highway, services the Lompoc Gate. The northern end of Santa Lucia Canyon Road starts at US 1 becomes Floradale

Table 3-9.
Level of Service scale.

LOS	Description	Criteria (V/C)		
		Multi-Lane Arterial	Two-Lane Highway	Delays[(a)]
A	Free flow with users unaffected by presence of other roadway users	0 – 0.30	0 – 0.15	<10.0
B	Stable flow, but presence of the users in traffic stream becomes noticeable	0.31 – 0.50	0.16 – 0.27	10.0 – 20.0
C	Stable flow, but operations of single users becomes affected by interaction with others in traffic stream	0.51 – 0.70	0.28 – 0.43	20.0 – 35.0
D	High density, but stable flow, speed and freedom of movement are severely restricted; poor level of comfort and convenience	0.71 – 0.84	0.44 – 0.64	35.0 – 55.0
E	Unstable flow; operating conditions at capacity with reduced speeds; maneuvering difficult and extremely poor levels of comfort and convenience	0.85 – 1.00	0.65 – 1.00	55.0 – 80.0
F	Forced breakdown flow with traffic demand exceeding capacity; unstable stop-and-go traffic	>1.00	>1.00	>80.0

NOTES:
V = Volume C = Capacity (a) Average stop delay at intersections.

Avenue and connects to Central Avenue. The southern end of Floradale Avenue/Santa Lucia Canyon Road terminates at SR 246. SR 246 services the Solvang Gate. Directly across SR 246 from the Solvang Gate is the South Base Gate (Figure 2-1B), the primary access for South Vandenberg AFB. Further west, at the terminus of SR 246, is the Coast Gate, which is normally closed, but is occasionally opened for oversized shipments to South Vandenberg AFB.

Informal traffic studies of the intersections of San Lucia Canyon Road and US 1, and Floradale Avenue and Central and Ocean Avenues, indicate the intersections operate in the LOS A to C range. Force Protection Conditions (FPCON) widely varies the LOS at base gates. The FPCONs start at "Normal" and go to Alpha, Bravo, Charlie, and Delta as the potential threat levels increase. With each step up from normal, the number of protective measures implemented increases. The protective measures range from 100% identification check, to searches of random vehicles, to searches of all vehicles, to controlled access where only mission critical personal are allowed entry to the base. As the FPCON level increases, the traffic delays at the gates increase. All commercial vehicles must stop and be checked prior to access to the base regardless of the FPCON level. Informal traffic studies indicate the gates operate at LOS A to C range.

Project Traffic and Haul Routes

The Base Landfill is located on North Vandenberg AFB off 6th Street, between Utah and Iceland Avenues. There are two possible haul routes to the Base Landfill from proposed project sites outside of North Vandenberg AFB (Figures 3-4A and 3-4B):

- Solvang Gate – access the gate at SR 246/West Ocean Avenue, travel north on 13th Street, turn east on Utah Avenue and south on 6th Street.
- Lompoc Gate – access the gate through Floradale Avenue/Santa Lucia Canyon Road, continue north on Pine Canyon Road, turn west onto Utah Avenue and south on 6th Street.

Access to the Base Landfill from proposed project sites on North Vandenberg AFB would be through Utah Avenue and 6th Street.

Main roads on North Vandenberg AFB include California Boulevard, Washington Avenue/Pine Canyon Road, 13th Street, and El Rancho Road. Main roads on South Vandenberg AFB include Arguello Boulevard, Bear Creek Road and Coast Road.

There are several routes available to traffic leaving the local area:

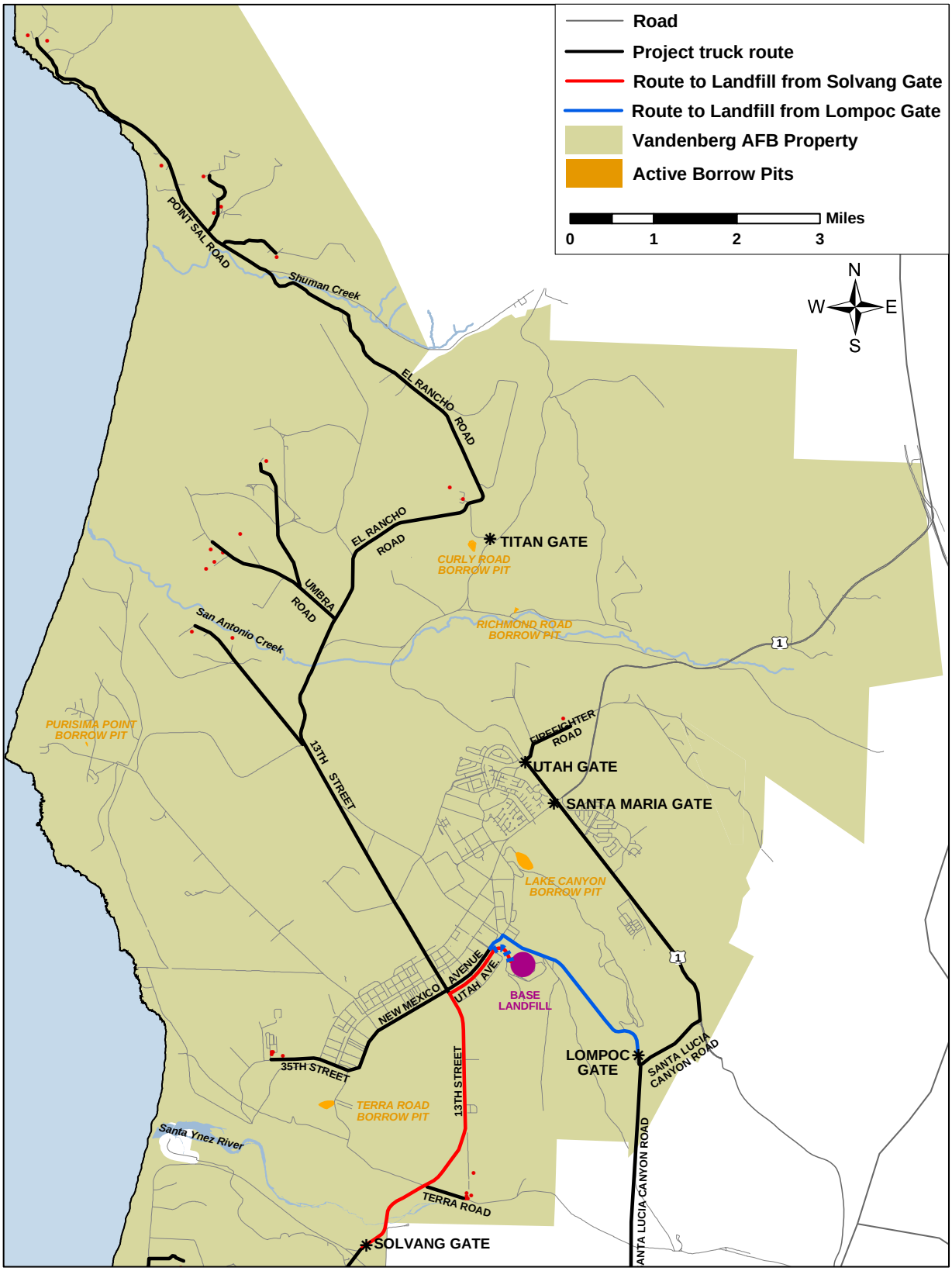

Figure 3-4A. Proposed transportation routes for demolition sites on North Vandenberg AFB.

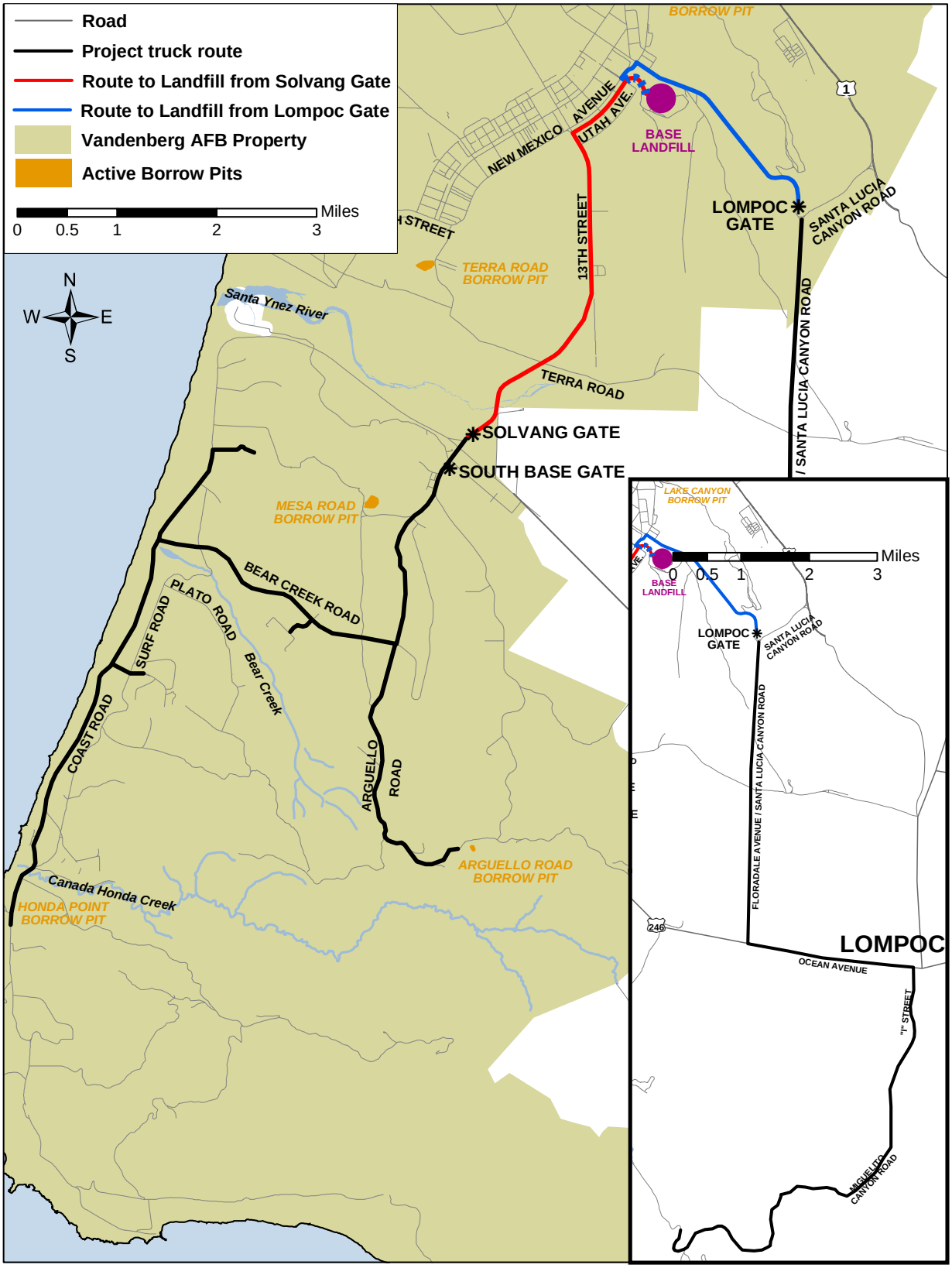

Figure 3-4B. Proposed transportation routes for demolition sites on South Vandenberg AFB.

- Exit Vandenberg AFB through either the South Base Gate or the Solvang Gate, turn east on West Ocean Avenue/SR 246 and continue on SR 246 until reaching US 101
- Exit Vandenberg AFB through either the South Base Gate or the Solvang Gate, turn east on West Ocean Avenue/SR 246, turn north on "H" Street, which is also US 1, and continue north until reaching SR 135 to Santa Maria and connecting with US 101.
- Exit Vandenberg AFB through the Lompoc Gate, turn east onto Santa Lucia Canyon Road to US 1, proceed south to SR 246 and connect to US 101.
- Exit Vandenberg AFB through the Lompoc Gate, turn east onto Santa Lucia Canyon Road to US 1, proceed north to SR 135 and connect to US 101.

Project associated traffic and haul routes to the Base Landfill from proposed demolition sites are described below and depicted in Figure 3-4A and 3-4B.

Buildings 98 and 99 are located on Miguelito Canyon Road, south of Lompoc. Traffic associated with the Proposed Action would travel on Miguelito Canyon Road, which becomes "I" Street in the city of Lompoc, Ocean Avenue, and Floradale Avenue/Santa Lucia Canyon Road, outside of Vandenberg AFB. Within Vandenberg AFB traffic would travel through 13th Street or Pine Canyon Road, Utah Avenue, and 6th Street.

- To reach the Base Landfill, the traffic would turn west on Ocean Avenue and proceed to the Base Landfill through either the Solvang Gate or the Lompoc Gate.
- To leave the local area, traffic would turn east on Ocean Avenue and proceed as described above.

Buildings 470, 480, and 488 are located on Arguello Road, on South Vandenberg AFB. Traffic associated with the Proposed Action would travel on Arguello Road, 13th Street, Utah Avenue and 6th Street.

- To reach the Base Landfill, traffic would proceed through the Solvang Gate.
- To leave the local area, traffic would exit Vandenberg AFB through the South Base Gate.

Building 535 is located on Coast Road, on South Vandenberg AFB. Traffic associated with the Proposed Action would travel on Coast Road, Bear Creek Road, Arguello Road, 13th Street, Utah Avenue and 6th Street.

- To reach the Base Landfill, traffic would proceed through the Solvang Gate.
- To leave the local area, traffic would exit Vandenberg AFB through the South Base Gate.

SLC-4 (Buildings 702 through 736) is located at the end of Kelp Road, on South Vandenberg AFB. Traffic associated with the Proposed Action would travel on Kelp Road, Coast Road, Bear Creek Road, Arguello Road, 13th Street, Utah Avenue and 6th Street.

- To reach the Base Landfill, traffic would proceed through the Solvang Gate.
- To leave the local area, traffic would exit Vandenberg AFB through the South Base Gate.

Building 768 is located at the end of Napa Road, on South Vandenberg AFB. Traffic associated with the Proposed Action would travel on Napa Road, Bear Creek Road, Arguello Road, 13th Street, Utah Avenue and 6th Street.

- To reach the Base Landfill, traffic would proceed through the Solvang Gate.
- To leave the local area, traffic would exit Vandenberg AFB through the South Base Gate.

Building 946 is located at the end of Cooke Road, on South Vandenberg AFB. Traffic associated with the Proposed Action would travel on Cooke Road, Coast Road, Bear Creek Road, Arguello Road, 13th Street, Utah Avenue and 6th Street.

- To reach the Base Landfill, traffic would proceed through the Solvang Gate.
- To leave the local area, traffic would exit Vandenberg AFB through the South Base Gate.

Santa Ynez Water Plant (Buildings 1200 through 1209) is located on Terra Road, on North Vandenberg AFB. Traffic associated with the Proposed Action would travel on Terra Road, 13th Street, Utah Avenue and 6th Street.

- To reach the Base Landfill, traffic would proceed on 13th Street and Utah Avenue.
- To leave the local area, traffic would exit Vandenberg AFB through the Solvang Gate or the Lompoc Gate.

Building 1505 is located on 35th Street, on North Vandenberg AFB. Traffic associated with the Proposed Action would travel on 35th Street, which becomes New Mexico Avenue, 6th Street, and 13th Street or Pine Canyon Road.

- To reach the Base Landfill, traffic would travel on 35th Street/New Mexico Avenue and proceed to the Base Landfill.
- To leave the local area, traffic would exit Vandenberg AFB through either the Solvang Gate or the Lompoc Gate.

Buildings 1537, 1538, and 1539 are located on 35th Street, on North Vandenberg AFB. Traffic associated with the Proposed Action would travel on 35th Street/New Mexico Avenue, 6th Street, and 13th Street or Pine Canyon Road.

- To reach the Base Landfill, traffic would travel on 35th Street/New Mexico Avenue and proceed to the Base Landfill.
- To leave the local area, traffic would exit Vandenberg AFB through either the Solvang Gate or the Lompoc Gate.

Buildings 1783 and 1795 are located at the north end of 13th Street, on North Vandenberg AFB. Traffic associated with the Proposed Action would travel on 13th Street, Utah Avenue, 6th Street, and could also use Pine Canyon Road.

- To reach the Base Landfill, traffic would travel on 13th Street to Utah Avenue and proceed to the Base Landfill.
- To leave the local area, traffic would exit Vandenberg AFB through either the Solvang Gate or the Lompoc Gate.

Buildings 1823 and 1825 are located on Brio Road, on North Vandenberg AFB. Traffic associated with the Proposed Action would travel on Brio Road, Umbra road, El Rancho Road, 13th Street, Utah Avenue, 6th Street, and could also use Pine Canyon Road.

- To reach the Base Landfill, traffic would travel on Brio Road, Umbra Road, El Rancho Road, 13th Street, Utah Avenue and proceed to the Base Landfill.
- To leave the local area, traffic would exit Vandenberg AFB through either the Solvang Gate or the Lompoc Gate.

Buildings 1830 and 1836 are located off Umbra Road, on North Vandenberg AFB. Traffic associated with the Proposed Action would travel on Umbra road, El Rancho Road, 13th Street, Utah Avenue, 6th Street, and could also use Pine Canyon Road.

- To reach the Base Landfill, traffic would travel on Brio Road, Umbra Road, El Rancho Road, 13th Street, Utah Avenue and proceed to the Base Landfill.
- To leave the local area, traffic would exit Vandenberg AFB through either the Solvang Gate or the Lompoc Gate.

Building 1835 is located on an unnamed road off Umbra Road, on North Vandenberg AFB. Traffic associated with the Proposed Action would travel on the unnamed road, Umbra Road, El Rancho Road, 13th Street, Utah Avenue, 6th Street, and could also use Pine Canyon Road.

- To reach the Base Landfill, traffic would travel on the unnamed road, Umbra Road, El Rancho Road, 13th Street, Utah Avenue and proceed to the Base Landfill.
- To leave the local area, traffic would exit Vandenberg AFB through either the Solvang Gate or the Lompoc Gate.

Building 1853 are located off Sun Road, on North Vandenberg AFB. Traffic associated with the Proposed Action would travel on Sun Road, El Rancho Road, 13th Street, Utah Avenue, 6th Street, and could also use Pine Canyon Road.

- To reach the Base Landfill, traffic would travel on Sun Road, El Rancho Road, 13th Street, Utah Avenue and proceed to the Base Landfill.
- To leave the local area, traffic would exit Vandenberg AFB through either the Solvang Gate or the Lompoc Gate.

Building 1874 is located off Star Road, on North Vandenberg AFB. Traffic associated with the Proposed Action would travel on Star Road, Sun Road, El Rancho Road, 13th Street, Utah Avenue, 6th Street, and could also use Pine Canyon Road.

- To reach the Base Landfill, traffic would travel on Star Road, Sun Road, El Rancho Road, 13th Street, Utah Avenue and proceed to the Base Landfill.
- To leave the local area, traffic would exit Vandenberg AFB through either the Solvang Gate or the Lompoc Gate.

Building 1895 is located off Pega Road, on North Vandenberg AFB. Traffic associated with the Proposed Action would travel on Pega Road, Umbra Road, El Rancho Road, 13th Street, Utah

Avenue, 6th Street, and could also use Pine Canyon Road.

- To reach the Base Landfill, traffic would travel on Pega Road, Umbra Road, El Rancho Road, 13th Street, Utah Avenue and proceed to the Base Landfill.
- To leave the local area, traffic would exit Vandenberg AFB through either the Solvang Gate or the Lompoc Gate.

Building 1952 is located on Taft Road, on North Vandenberg AFB. Traffic associated with the Proposed Action would travel on Taft Road, Point Sal Road, El Rancho Road, 13th Street, Utah Avenue, 6th Street, and could also use Pine Canyon Road.

- To reach the Base Landfill, traffic would travel on Taft Road, Point Sal Road El Rancho Road, 13th Street, Utah Avenue and proceed to the Base Landfill.
- To leave the local area, traffic would exit Vandenberg AFB through either the Solvang Gate or the Lompoc Gate.

Buildings 1953, 1957, and 1958 are located on Globe Road, on North Vandenberg AFB. Traffic associated with the Proposed Action would travel on Globe Road, Point Sal Road, El Rancho Road, 13th Street, Utah Avenue, 6th Street, and could also use Pine Canyon Road.

- To reach the Base Landfill, traffic would travel on Globe Road, Point Sal Road, El Rancho Road, 13th Street, Utah Avenue and proceed to the Base Landfill.
- To leave the local area, traffic would exit Vandenberg AFB through either the Solvang Gate or the Lompoc Gate.

Buildings 1982, 1992 and 1995 are located off of Point Sal Road, on North Vandenberg AFB. Traffic associated with the Proposed Action would travel on Point Sal Road, El Rancho Road, 13th Street, Utah Avenue, 6th Street, and could also use Pine Canyon Road.

- To reach the Base Landfill, traffic would travel on Point Sal Road, El Rancho Road, 13th Street, Utah Avenue and proceed to the Base Landfill.
- To leave the local area, traffic would exit Vandenberg AFB through either the Solvang Gate or the Lompoc Gate.

Building 20220 is located on Firefighter Road, on North Vandenberg AFB. Traffic associated with the Proposed Action would travel on Firefighter Road, Lompoc-Casmalia Road/US 1, Santa Lucia Canyon Road, Pine Canyon Road, Utah Avenue and 6th Street.

- To reach the Base Landfill, traffic would travel on Firefighter Road, Lompoc-Casmalia Road/US 1, Santa Lucia Canyon Road, access Vandenberg AFB through the Lompoc Gate, proceeding to the Base Landfill from Pine Canyon Road.
- To leave the local area, traffic would travel on US 1, SR 135 and US 101.

3.9. Water Resources

The general storm water rainy season is from 15 October to 15 April. This timeframe has the greatest potential of demolition site pollutant runoff. The long-term average precipitation in the area is 14 inches per year (USAF 1994).

3.9.1. Surface Water and Floodplains

The major freshwater resources of the Vandenberg AFB region include six streams, comprising two major and four minor drainages. The major drainages are San Antonio Creek and the Santa Ynez River. The minor drainages include Shuman, Bear, Cañada Honda, and Jalama Creeks. Aquifers capable of yielding large quantities of water usable for water supply are generally restricted to the deeper portions of the Santa Ynez River and San Antonio Creek (USAF 1998b). Freshwater resources on Vandenberg AFB can be divided into four geographic areas: north, north-central, south-central, and south areas.

Watersheds are subject to on-base construction and agricultural runoff. San Antonio Creek, Santa Ynez River, and Shuman Creek also receive off-base agricultural runoff resulting in elevated dissolved solids, phosphates, and nitrates. Surface water is not directly used as a potable water supply at Vandenberg AFB. Ambient water quality sampling is performed by the Air Force.

North Area

The North Area comprises Shuman Canyon and several seasonal stream drainages (Figure

3-5). Shuman Creek, and its tributaries, have seasonal flows that are present during and shortly after rain events. The Casmalia Hills on the northern boundary of Vandenberg AFB naturally divide the flow direction of Shuman Creek. East of these hills, Shuman Creek flows off-base toward Casmalia, while west of these hills it flows in a westerly direction towards the Pacific Ocean. Localized permanent and seasonal wetlands, ponds, and streams are present throughout this Northern Area. The surface topography presents rolling sand dunes along the coast, moderately steep slopes in the Casmalia Hills to the north of Shuman Canyon, and the older, fixed dunes of the interior sections of San Antonio Terrace, to the south of Shuman Canyon. Soils are generally sandy and highly permeable. No wetlands occur within 0.5 mile of any of the buildings slated for demolition or abandonment under the Proposed Action.

The closest building to Shuman Creek is Building 1952, which is approximately 0.22 mile north of the creek (Figure 3-5). The closest building in this area to the coast and ocean is Building 1995 (approximately 0.15 miles)

North-Central Area

The North-Central Area contains the main cantonment area of the base and it is heavily influenced by human activity. The north-central area includes the San Antonio Creek drainage, the Santa Ynez River drainage north of the river, and some permanent and seasonal wetlands, ponds and streams (Figure 3-6). The surface topography ranges from active sand dunes along the coast, to older, fixed dunes in the interior sections of San Antonio Terrace, north of San Antonio Creek, to the peneplain represented by Burton Mesa, which extends from San Antonio Valley to the Santa Ynez River Valley. The soil is generally sandy and highly permeable. The drainage divide between the San Antonio Creek basin and the Santa Ynez River basin occurs in the southern portion of Burton Mesa. The Santa Ynez lagoon covers 58 acres in the southwest corner of this area.

San Antonio Creek drains an area of approximately 154 square miles, and flows westward to discharge into a lagoon impounded behind the coastal dunes on north Vandenberg AFB. The upper reaches of San Antonio Creek (i.e., upstream of Barka Slough) have intermittent flows, generally as runoff from the winter rains from November through April. The lower reaches of San Antonio Creek (i.e., downstream of Barka Slough) are perennial and are fed by surfacing groundwater in Barka Slough. In the lower San Antonio Creek basin, water from the creek flows west-northwest to the sea. Marshlands are located along part of its course. The creek ends in a small lagoon in the sand dunes, which breaks through to the Pacific Ocean only during large storms. The Santa Ynez River flows westward to discharge into the Pacific Ocean. The river watershed has a total drainage area of about 900 square miles of which less than 5% is within Vandenberg AFB (USAF 2003). Flow in the Santa Ynez River varies seasonally in response to precipitation and runoff. From June through November, the river flow is typically less than seven cubic feet per second, including effluent from the Lompoc Regional Wastewater Treatment Plant, about five miles upstream from the13th Street Bridge. The flow of the Santa Ynez River has been regulated since 1920 by Gibraltar Reservoir and since 1930 by Jameson Lake. Additional flow regulation has existed since 1952 from Lake Cachuma. Water is diverted out of the Santa Ynez basin from these three reservoirs for municipal use in the Santa Barbara area. In addition, water is pumped from wells along the river for irrigation (URS 1987).

High discharge and flooding may occur in the Santa Ynez River and San Antonio Creeks from November through April, and there may be very little or no discharge occurring in the drier months. The presence of high levels of total dissolved solids, sulfates, chlorides, and iron causes poor water quality in San Antonio Creek and the Santa Ynez River (USAF 2001).

In this North-Central Area, Buildings 1783, and 1795, are the closest to San Antonio Creek, located approximately 0.10, and 0.24 mile respectively, on a plateau south of and approximately 175 feet above the creek (Figure 3-6). The next closest buildings (Buildings 1823, 1825, 1830, 1835, and 1836) are at least 0.45 mile north of San Antonio Creek. Building 20220 is located on an up gradient approximately 0.13 miles south of Punchbowl Lake.

The 100-year floodplain for the Santa Ynez River basin was defined by the Federal Emergency Management Agency (FEMA) and is depicted in Figure 3-6. The nearest buildings to the 100-year floodplain are located at the abandoned Santa Ynez Water Plant (Buildings 1200, 1201, 1202, 1204, 1205, and 1209), approximately 0.03 mile north of the closest edge

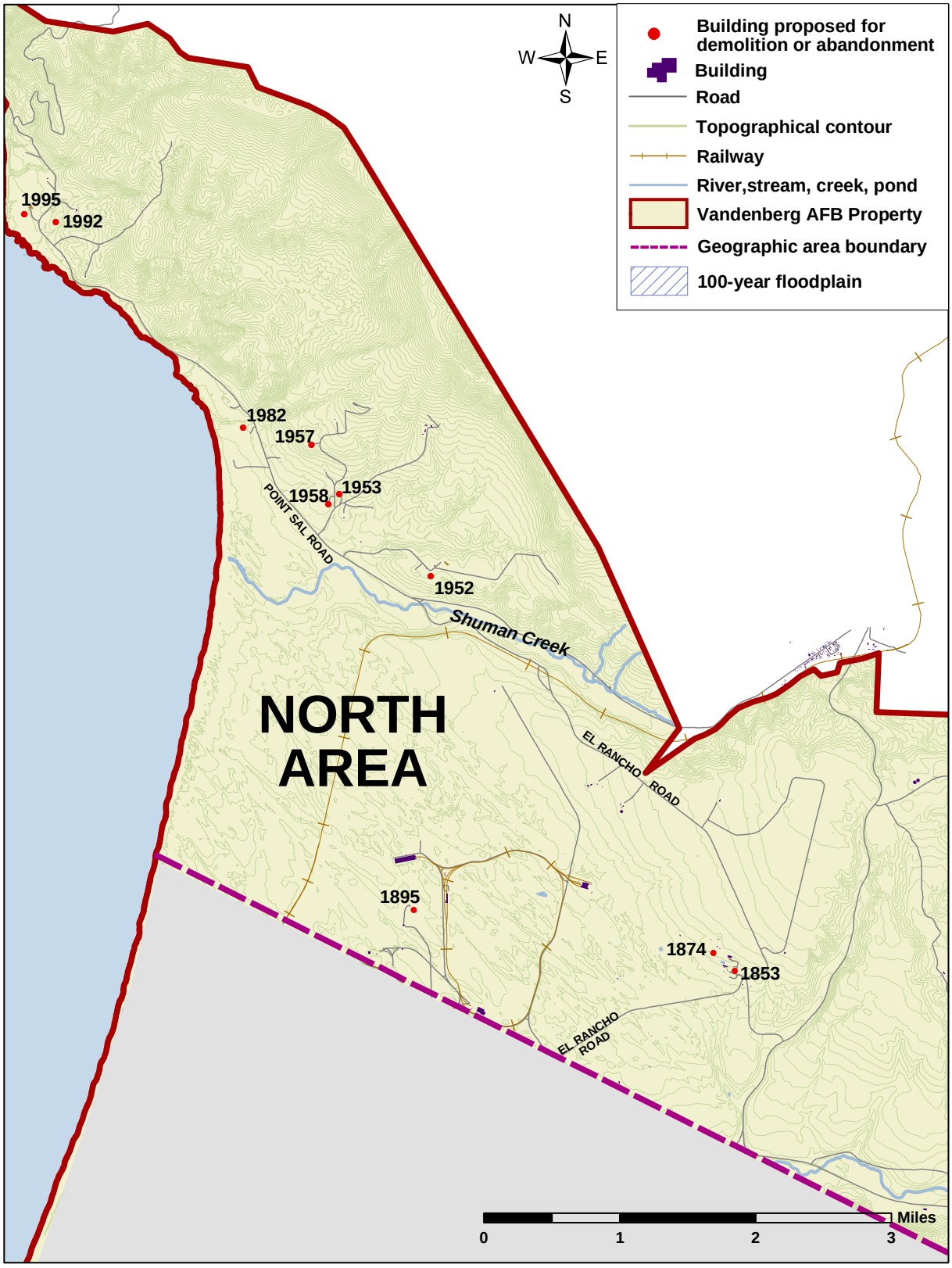

Figure 3-5. Buildings proposed for demolition or abandonment within the geographic North Area of Vandenberg AFB.

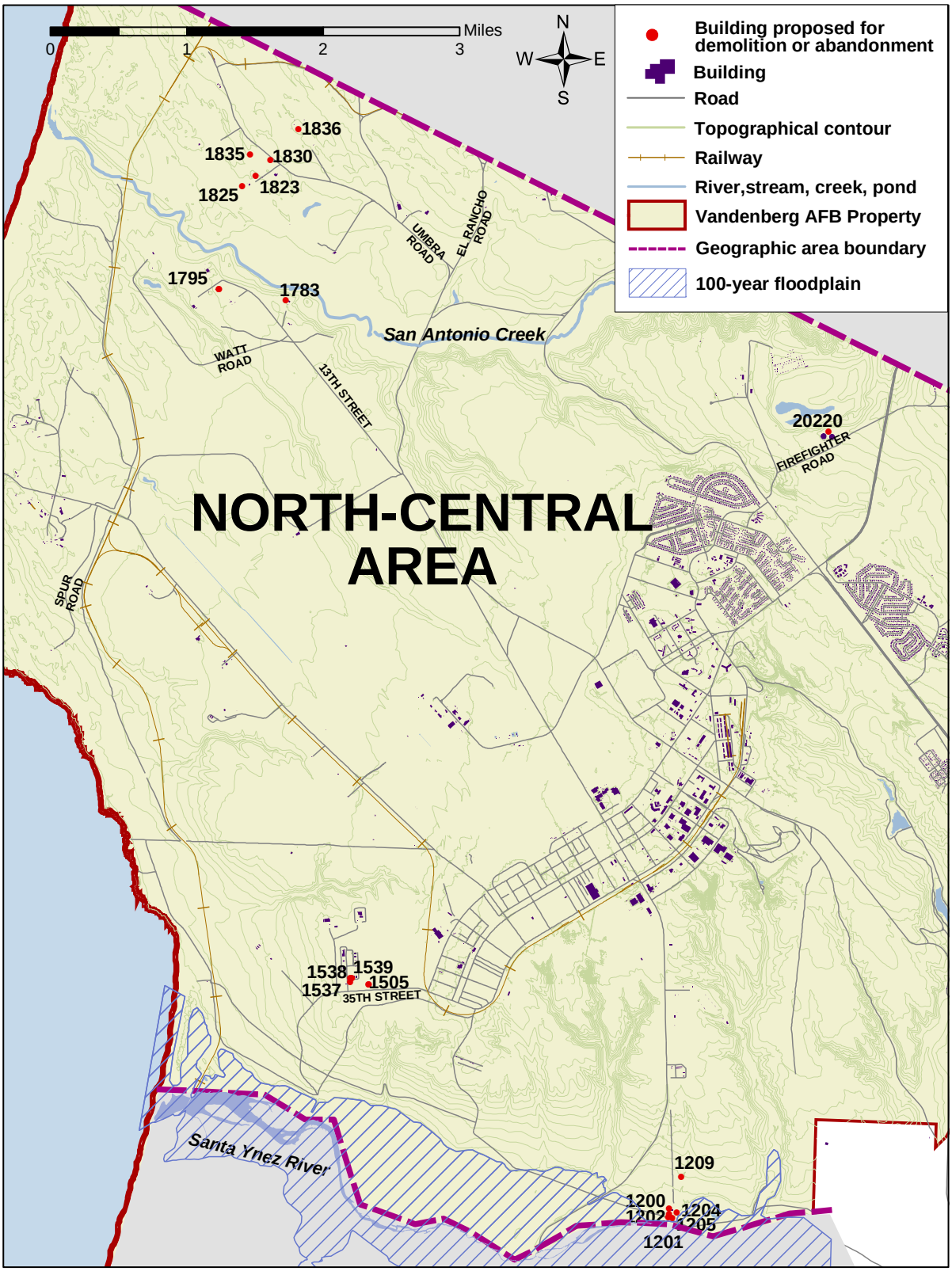

Figure 3-6. Buildings proposed for demolition or abandonment within the geographic North-Central Area of Vandenberg AFB.

of this floodplain, and 0.1 mile north of the Santa Ynez River.

In the cantonment area, the storm water system diverts storm water runoff to low-lying areas as surface flow via streets, concrete-lined gutters, earthen ditches, and natural drainage systems. The cantonment area storm water drainage is predominantly concrete lined channels and subsurface piping, which generally divert the water to several natural drainages that discharge into either the Santa Ynez River or San Antonio Creek.

South-Central Area

The south-central area includes the southern part of the Santa Ynez River drainage, Bear Creek, Cañada Honda, and several small, seasonal stream drainages (Figure 3-7). This area includes what is known as the Lompoc Terrace, which extends south from the Santa Ynez River Valley to Cañada Honda Creek. It is a gently rounded, north trending, low ridge extending from an elevation of approximately 450 feet down to the Santa Ynez River floodplain. Dunes extend only a short distance inland from the coast along this terrace. South of the Lompoc Terrace and Cañada Honda Creek are the western Santa Ynez Mountains, which includes a number of small seasonal streams. The topography in this area is complex and is dissected by major canyons. The soils in the South-Central Area tend to be well-drained sandy loams or clay loams.

Bear Creek is an intermittent annual creek that originates approximately 3.4 miles southeast of its discharge into the Pacific Ocean. A seasonal pond occurs near the discharge of the creek, east of Coast Road and south of Bear Creek Road. Jurisdictional wetlands are adjacent to the creek. Cañada Honda Creek is a seasonal flowing creek with a watershed that is approximately 12 square miles in area. It originates in the Santa Ynez Mountains, near the eastern boundary of south Vandenberg AFB and flows westward discharging into the Pacific Ocean.

Smaller streams and westerly hillsides often have a natural berm area, generally along the railroad tracks and the Pacific Ocean. These berms provide a natural barrier for water to settle and slow down its flow prior to being infiltrated and continuing their generally westward flow. Some smaller streams flow directly into the Pacific Ocean. Many of these streams on south Vandenberg AFB are highly vegetated and have seasonal flows.

Building 768 is the closest to Bear Creek, approximately 0.27 mile (Figure 3-7). The closest building to Cañada Honda Creek is Building 535, approximately 0.55 mile south of the creek (Figure 3-7). This building is also the closest to the Pacific Ocean (0.15 mile).

Southern Area

The southern area consists primarily of Sudden Ranch, Jalama Creek, small streams, and two permanent ponds. None of the buildings slated for demolition or abandonment under this PEA are located within this area. Thus no further evaluation and analysis for this area was completed.

3.9.2. Groundwater

Vandenberg AFB includes parts of two major groundwater basins, and at least two subbasins. Most of the northern third of the base is within the San Antonio Creek Basin, while most of the southern two-thirds of the base are within the Santa Ynez River Basin and associated Lompoc Terrace and Cañada Honda Subbasins.

The main groundwater basin on the northern portion of Vandenberg AFB is the San Antonio Creek Basin. This basin coincides with the San Antonio Creek drainage basin. The San Antonio Creek Basin is approximately 25 miles long, extending from four miles east of the town of Los Alamos, west to the Pacific Ocean, and is a maximum of one mile wide. Water-bearing units in the San Antonio Creek Basin are comprised of unconsolidated clay, silt, sand, and gravel. These unconsolidated sediments are up to 4,000 feet thick and overlie consolidated Tertiary rocks, which are generally not water bearing.

Across the eastern two-thirds of the San Antonio Creek Basin, largely east of Vandenberg AFB, groundwater flows toward San Antonio Creek, and then west toward the Pacific Ocean. Approximately two miles west of the Vandenberg AFB boundary, a naturally occurring consolidated rock barrier causes the groundwater to rise to the surface where it forms the Barka Slough, and discharges to San Antonio Creek. Because of this nearly continual discharge of groundwater, San Antonio Creek west of Barka Slough runs year-round, whereas all other drainages in the valley are ephemeral (Muir 1964). West of Barka

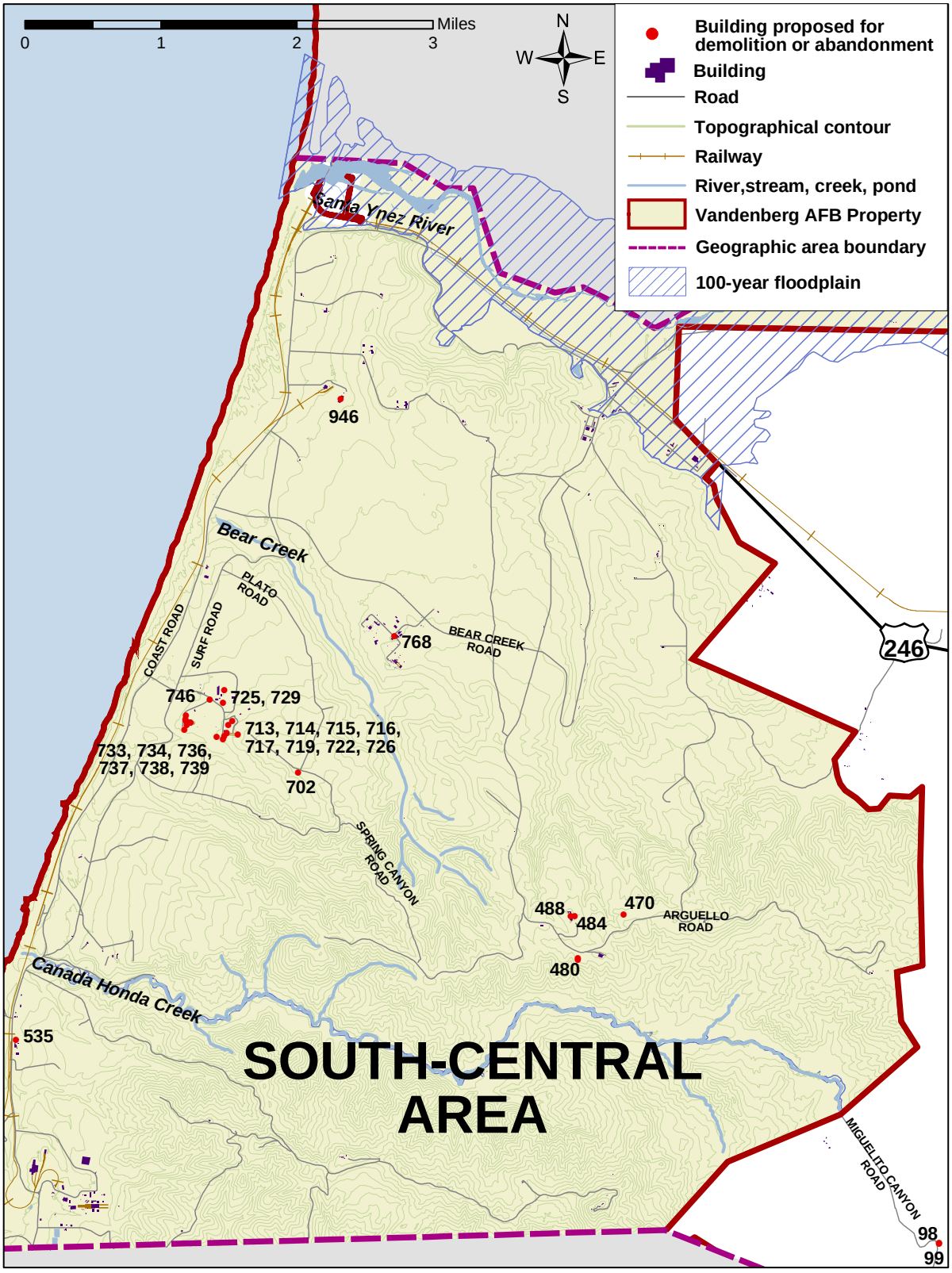

Figure 3-7. Buildings proposed for demolition or abandonment within the geographic South-Central Area of Vandenberg AFB.

Slough, across San Antonio Terrace and Burton Mesa, the unconsolidated water-bearing units are only on the order of tens to a few hundred feet thick, comprised of dune sands, recent alluvium, and the Orcutt Sand. The flow direction in this area is controlled by bedrock topography, which is obscured by the overlying unconsolidated sediments, but is believed to mimic surface topography (Science Applications International Corporation [SAIC] 1990). Groundwater flow direction is therefore likely to be generally toward San Antonio Creek.

The Santa Ynez River Basin is approximately 70 miles long, and a maximum of 15 miles wide. It extends west from about half a mile east of the Santa Barbara County line to the coast. The Santa Ynez Mountains and Lompoc Terrace bound the basin to the south and the San Raphael Mountains, the lower Purisima Hills, and Burton Mesa bound it to the north. The Lompoc Plain represents the westernmost reach of the Santa Ynez River Basin. The most productive water-bearing zones of the entire Santa Ynez River Basin underlie this alluvial plain. Vandenberg AFB lies along the coast and traverses the westernmost three to four miles of the Lompoc Plain, where it is bounded to the south by the Lompoc Terrace and to the north by Burton Mesa (SAIC 1990). Groundwater in the Lompoc Plain area is divided into two main bodies: a shallow, unconfined body, and a deep, confined body. These two groundwater bodies are generally not hydrologically connected, but do appear to be connected in a few restricted areas. Where the comparison can be made, the hydraulic head of the shallow body is generally one to 10 feet higher than that of the deep body. Groundwater flow direction in the shallow body is irregular and poorly defined, and changes over time in response to seasonal changes (Upson and Thomasson 1951).

The most significant water-bearing zones on Vandenberg AFB, south of the Santa Ynez River Basin, are within the Lompoc Terrace subbasin. The drainage divide between Cañada Honda Creek and the Santa Ynez River bound this subbasin to the south, the Santa Ynez River to the north, the Pacific Ocean to the west, and the La Salle Canyon to the east. The water-bearing units of this subbasin have accumulated in a structural depression caused by faulting along its southern margin, and either faulting or folding along its northern margin (SAIC 1990). The basin is regarded as a subbasin because it is likely hydrologically connected with the Santa Ynez River Basin to the east, and possibly with the Pacific Ocean to the west (Evenson and Miller 1963). Groundwater in the Lompoc Terrace subbasin generally flows northeast to the Lompoc Plain or northwest to the ocean. Recharge to the subbasin is from infiltration of local precipitation, and from percolation of surface runoff (Evenson and Miller 1963). Immediately south of the Lompoc Terrace subbasin is the Cañada Honda subbasin. The subbasin is relatively small and is bounded to the north and south by the drainage divides to the Cañada Honda Creek.

Groundwater quality in the region meets all National Primary Drinking Water Regulation standards (USAF 1989). Continued overdraft of the groundwater basins could lead to degradation in the water table levels and a compaction of the basins. A slight decrease in water quality has been occurring in the region due to the use of water for irrigation. As this water flows through the soil back to the basin, it entrains salts and leads to a buildup of salts in the groundwater (USAF 1989). Groundwater monitoring is conducted for basins that are used for drinking water. Water in the San Antonio Valley Creek groundwater basin exceeds drinking water standards for total dissolved solids, manganese, and iron. The Lompoc Terrace groundwater contains constituents that exceed maximum contaminant levels for total dissolved solids. Groundwater is used about one to three weeks per year, while maintenance is being performed on the state water line. However, groundwater is treated prior to its usage as potable water.

Chapter 4. Affected Environment

This chapter presents the results of the analysis of potential environmental effects of implementing the Proposed Action and Alternatives as described in Chapter 2.

4.1. Air Quality

The criteria for determining the significance of air quality impacts are based upon federal, state, and Santa Barbara County standards and regulations. Impacts would be considered to be significant if project emissions increase ambient pollutant concentrations from below the NAAQS or CAAQS to above these standards, or if they contribute measurably to an existing or projected ambient air quality standard violation.

In non-attainment or maintenance areas, federal agencies are required to prepare a conformity determination to prevent federal actions from causing an exceedance of a national ambient air quality standard. To reduce the time and resources federal agencies expend in preparing conformity determinations, EPA developed de minimis levels that serve as thresholds for focusing on those actions likely to have the most significant impacts. EPA deemed that emission levels below the de minimis levels were not significant.

As of June 15, 2005, Santa Barbara is in attainment of all federal air quality standards, and federal agencies are no longer required to prepare conformity determinations. However, Vandenberg AFB believes the threshold levels used in conformity determinations are still relevant for use as thresholds for determining if air quality impacts would be significant. The rationale used by EPA to develop the thresholds for nonattainment areas is no less applicable for areas in attainment. Although Vandenberg AFB is no longer required to observe the significance levels required in conformity determinations, our voluntary use of them provides a conservative approach to determining air quality impacts.

Maintenance areas have de minimis levels of 100 tons/year for NO_x. The volatile organic compound (VOC) limits are 50 tons/year for areas inside an ozone transport region and 100 tons/year outside that region. Using a 365-day year, these de minimis levels equate to significance levels of 548 lbs/day of NO_x, and 274 or 548 lbs/day for VOCs for areas inside and outside of an ozone transport region, respectively. Vandenberg AFB will apply the 100 tons/year or 548 lbs/day VOC significance threshold. If Santa Barbara County becomes part of an Ozone Transport Region under the Clean Air Act, Vandenberg AFB will reassess its VOC significance threshold. These are the levels, 100 tons/year or 548 lbs/day of NOx, or VOC, Vandenberg AFB will use for determining whether or not air quality impacts are significant.

4.1.1. Proposed Action

Demolition activities for the Proposed Action would occur intermittently over a period that could last approximately ten years. Fugitive dust emissions generated from equipment operating on exposed ground and combustive emissions from the equipment would cause adverse air quality impacts. The largest adverse impacts would occur when vehicles disturb the soil on-site; smaller impacts would occur during the transport of C&D debris and material handling.

Because an equipment list and usage were not available, a complete detailed air emissions calculation could not be prepared. However, cost estimates, which included equipment usage, were prepared for the facilities and structures listed as Phase I and Phase II in the Disposition List (Appendix A). Using these equipment usage estimates, a detailed air emission inventory was prepared for Phase I and Phase II, and can be found in Appendix D.

Construction equipment used in Phases I and II are presented in Appendix D, Table D-1, while the emission factors used to estimate the emissions are found in Table D-3 and D-4. For purposes of this analysis, it was estimated that an

average of three acres per day were disturbed. It was further estimated that on a reasonable worst-case day, five acres would be disturbed. With a disturbance of eight-hours per day, the reasonable worst-case day fugitive dust emissions during Phase I would have been 140 pounds of PM_{l0} per day. These emissions would not be expected to cause an exceedance of any ambient air quality standard and therefore there would be no significant impacts from PM_{10}.

The methodology and assumptions used to calculate emissions from the Proposed Action are presented in Appendix D. The daily and total emission from construction activities can be found in Tables D-7 and D-8, respectively. The daily emissions were estimated to be 166 pounds of CO, 187 pounds of NO_x, 155 pounds of PM_{10}, 21 pounds of ROC, and less than a half a pound of SO_x. The project emissions from Phase I were estimated to be 10.69 tons of CO, 6.54 tons of NO_x, 23.30 tons of PM_{10}, and 1.25 tons of ROC, and 0.03 tons SO_x. As shown in Table D-9, the project emissions from Phase II were estimated to be 3.93 tons of CO, 5.81 tons of NO_x, 24.65 tons of PM_{10}, and 0.52 tons of ROC, and 0.04 tons of SO_x. Emissions from Phases I and II would not exceed the significance thresholds of 548 lbs/day or 100 tons/year. Therefore, no adverse impacts to the region's air quality would occur from Phases I or II.

The facilities in Phases I and II are similar in construction type and size as the facilities in the later phases. As such, the emissions from the demolitions of the remaining facilities and structures would be comparable to emissions from the Phase I demolition. However, to prevent significant impacts from later demolition activities, 30 CES/CEC would submit an AF Form 813, *Request for Environmental Impact Analysis* to 30 CES/CEV, indicating the preferred method of demolition or abandonment for the building(s) along with a detailed equipment list. 30 CES/CEV would estimate the air emissions based upon the methodology detailed in Appendix D, and maintain a calendar year and a 12-month rolling air inventory. When the cumulative calendar year emissions of NO_x, or ROC reach but not exceed 100 tons/year that request would receive clearance, but no further environmental clearances for projects would be given until the following calendar year. At no time would environmental clearances be given if the specific project emissions plus the cumulative calendar-year emissions of NO_x, or ROC exceed 100 tons/year.

Emissions from the demolition or abandonment of buildings under the Proposed Action would occur intermittently over a period of ten years, and be generated across Santa Barbara County as haul trucks move metals to the smelters for recycling. With the temporal and spatial distribution of emissions and the 100 tons/year of NO_x, or ROC significance thresholds, emissions from the Proposed Action would not cause an exceedance of an ambient air quality standard. Since no ambient air quality standards would be exceeded, impacts of the Proposed Action would not be considered significant.

Two required actions for the Proposed Action would need to be performed before any demolition could occur:

- Any portable equipment powered by an internal combustion engine rated at 20 brake-horsepower or greater must be registered in the California State-Wide Portable Equipment Registration Program or have a valid SBCAPCD Permit to Operate.
- Asbestos notifications would be made per Section 3.4.2.1 of this PEA.

4.1.2. No-Action Alternative

Under the No-Action Alternative, Atlas and Titan Heritage launch program facilities would not be demolished. 30 CES/CECBR would abandon facilities in-place. If funding is available, maintenance would be performed, but it is anticipated, the levels of maintenance would be lower than the current levels. With the same level or lower levels of maintenance, the air emissions from the No-Action alternative would be same or less than the current emissions and, therefore, the air quality would remain the same or even improve if lower levels of maintenance are performed.

4.1.3. Minimization Measures

Although significant emissions would not occur from the Proposed Action, the following SBCAPCD dust control measures would be implemented to further decrease fugitive dust emissions from ground disturbing activities:

- Apply water – preferably reclaimed - at least twice daily to dirt roads, graded areas, and dirt stockpiles to prevent excessive dust at the staging areas. Increase watering frequency whenever the wind speed exceeds 15 miles

per hour. Chlorinated water would not be allowed to run into any waterway.

- Minimize vehicle speeds on exposed earth.
- After completion of demolition activities, treat disturbed soil by watering, revegetating, or spreading soil binders to prevent wind erosion of the soil.
- Limit ground disturbance to the smallest, practical area and to the least amount of time.
- Designate personnel to monitor project activities to ensure that excessive dust is not generated at demolition sites.
- Comply with the SWPPP – including BMPs to reduce dust emissions - and the contractor's EPP, which includes dust control compliance measures.
- If importation, exportation, and stockpiling of fill material are involved, soil stockpiled for more than two days shall be covered, kept moist, or treated with soil binders to prevent dust generation. Trucks transporting fill material to and from the site shall be tarped from the point of origin.

In addition to the above dust control measures, the following control measures would be implemented to decrease diesel emissions:

- When feasible, use equipment powered with federally mandated "clean" diesel engines.
- Minimize the size of the engine in equipment used for the project.
- Manage the use of equipment to minimize the number of pieces of equipment operating simultaneously and total operation time for the project.
- Maintain engines in tune per manufacturer or operator's specification.
- Use CARB certified low diesel fuel.
- If feasible, install EPA or CARB certified diesel catalytic converters, diesel oxidation catalysts, and diesel particulate filters.
- Follow CARB developed idling regulations for trucks during loading and unloading
- If feasible, replace diesel equipment with electrical equipment.

4.2. Biological Resources

Federal agencies are required by Section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 USC 1531 *et seq.*), to assess the effect of any project on federally listed threatened and endangered species. Under Section 7, consultation with the U.S. Fish and Wildlife (USFWS) and the National Oceanic and Atmospheric Administration Fisheries Service (NOAA Fisheries) is required for federal projects if such actions could directly or indirectly affect listed species or destroy or adversely modify critical habitat. It is also Air Force policy to consider listed and special status species recognized by state agencies when evaluating impacts of a project. Impacts to biological resources would occur if special status species (endangered, threatened, rare, or candidate) or their habitats as designated by federal and state agencies would be affected directly or indirectly by project-related activities. In addition, impacts to biological resources are considered adverse if substantial loss, reduction, degradation, disturbance, or fragmentation would occur in native species habitats or in their populations. These impacts can be short- or long-term impacts, for example, short-term or temporary impacts from noise and dust during demolition, and long-term impacts from the loss of vegetation and thereby loss of the capacity of habitats to support wildlife populations.

Impacts to jurisdictional waters of the United States and wetlands are considered significant if the project would result in net loss of wetland area or habitat value, either through direct or indirect impacts to wetland vegetation, loss of habitat for wildlife, degradation of water quality, or alterations in hydrological functions. Projects resulting in a discharge of dredged or fill material within jurisdictional waters of the United States, including wetlands, require a permit from the U.S. Army Corps of Engineers (ACOE).

Different species are subject to different impacts and different sites support different species densities due to spatial variation in the number and type of habitats, the presence or absence of unique habitat features such as streams or vernal wetlands, and the degree of human-induced disturbance.

Potential impacts to biological resources include:

- Short-term (temporary) and long-term (permanent) loss of habitat from demolition

related activities such as access, deconstruction, and demolition.

- Loss of individuals within the work area due to excavation, crushing or burial.
- Loss of individuals in habitats adjacent to work areas due to soil erosion.
- Abandonment of breeding and/or roosting sites due to project related noise and associated disturbance.
- Disruption of foraging or roosting activities due to project related noise and associated disturbance.

4.2.1. Proposed Action

Adverse effects resulting from the Proposed Action are expected to include temporary, short-term effects. Implementing the measures described below, and included in Section 2.4.2 of Chapter 2, would prevent significant adverse effects to native plant communities, and protected plant and wildlife species during project implementation. Table 4-1 lists sensitive plant communities and plant and wildlife species documented at the various buildings proposed for demolition or abandonment, and summarizes potential adverse effects to these resources from implementing the Proposed Action.

4.2.1.1. Botanical Resources

Most of the buildings proposed for demolition or abandonment are situated on concrete, asphalt, or pavement. Some of the buildings are situated on or have intervening non-native grassland dominated by species that would be considered weedy and in some cases invasive, and others are on or are surrounded by highly disturbed plant communities including coastal dune scrub and central coastal scrub. The plant communities in the vicinity of sites where demolition and abandonment activities would occur vary by site and include non-native grassland, Burton Mesa Chaparral, Coastal Dune Scrub, Central Coastal Scrub, and Eucalyptus-Monterey Pine Windbreak. Appendix B describes the plant communities present at each of the sites.

Access to all buildings would be through existing paved and unpaved roads and trails. Demolition and abandonment activities would be restricted to the immediate area surrounding each of the buildings and is not anticipated to extend beyond a 30-foot radius at each building site. Disturbances to plant communities surrounding each building site would therefore be restricted. While some vegetation would be irreversibly damaged, these losses would not be considered significant given the degraded nature of much of the vegetation surrounding the sites. Potential adverse effects to sensitive plant communities are described in more detail below.

After completion of demolition and abandonment activities, each site would be hydro-seeded with a mixture pre-approved by 30 CES/CEV to minimize potential for erosion and runoff.

Sensitive Habitats and Special Status Plant Species

Burton Mesa Chaparral, a sensitive plant community is present adjacent to Buildings 470, 480, 484, 488, and 1505. Implementing the Proposed Action has the potential to affect vegetation within an approximately 30-foot radius surrounding these buildings. Some of the vegetation may be disturbed to accomplish demolition and abandonment activities. Because the method of demolition has not been selected at this time, the acreage of Burton Mesa Chaparral that would be affected is unknown. At the present time, it is estimated that the disturbed habitat would be less than one acre. To minimize disturbances to this habitat, where feasible, demolition equipment and methods that minimize disturbance to areas outside the building footprint would be used. Where vegetation must be disturbed, drive over, crush or cut, rather than excavation, would provide the opportunity for root systems to remain intact and the vegetation to resprout.

If permanent impacts cannot be avoided, the Air Force would evaluate those actual impacts and develop and implement a restoration plan.

A botanical survey completed in June 2005 confirmed the presence of the federally endangered Gaviota tarplant within a chain-link fenced area on the eastern side of the Santa Ynez Water Plant (Buildings 1200, 102, 1202, 1204, 1205, and 1209). Several individuals were also documented outside but in the immediate vicinity of the chain-link fence. Demolition activities would not occur near this area (see Figure 3-1). Thus, no impacts to this federally endangered plant species are anticipated.

Table 4-1.
Potential project related impacts to native plant communities and plant and wildlife species.

Community/Plant Species	Status†	Potential Adverse Effects	Locations (Building #)
Burton Mesa Chaparral	Sensitive Habitat	Temporary disturbance to less than one acre within a 30-foot radius of buildings.	470, 480, 484, 488, 1505
Cliff swallow *Hirundo pyrrhonota*	MBTA	Loss of nest, eggs, nestlings if not excluded. Abandonment of nest site.	480, 1200, 1952, 1982
House finch *Carpodacus mexicanus*	MBTA	Loss of nest, eggs, nestlings if not excluded. Abandonment of nest site.	715, 716, 717, 722, 733, 734, 736, 738
Barn swallow *Hirundo rustica*	MBTA	Loss of nest, eggs, nestlings if not excluded. Abandonment of nest site.	480, 715, 738
Black phoebe *Sayornis nigricans*	MBTA	Loss of nest, eggs, nestlings if not excluded. Abandonment of nest site.	98, 717, 946
White-throated swift *Aeronautes saxatalis*	MBTA	Loss of nest, eggs, nestlings if not excluded. Abandonment of nest site.	715, 738
Western meadowlark *Sturnella neglecta*	MBTA	Loss of nest, eggs, nestlings if not excluded. Abandonment of nest site.	1874
Unidentified passerine birds	MBTA	Loss of nest, eggs, nestlings if not excluded. Abandonment of nest site.	98, 480, 484, 488, 535, 737, 768, 1200
Great-horned owl *Bubo virginianus*	MBTA	Loss of roosting sites.	484, 946
Barn owl *Tyto alba*	MBTA	Loss of nest, eggs, nestlings if not excluded. Loss of nesting and roosting sites.	484, 1537, 1783, 1823, 1825, 1835, 1836, 1895
Unidentified raptor – red-tailed hawk or red shouldered hawk likely	MBTA	Loss nest, eggs, nestlings if not excluded. Loss of nesting and roosting sites.	946
California myotis *Myotis californicus*		Entrapment if not excluded prior to demolition and abandonment activities. Loss or roosting sites.	470, 1200, 1830
Big brown bat *Eptesicus fuscus*		Entrapment if not excluded prior to demolition and abandonment activities. Loss or roosting sites.	470, 1825, 1835
Townsend's big-eared bat *Corynorhinus townsendii*	CSC	Entrapment if not excluded prior to demolition and abandonment activities. Loss or roosting sites.	1853
Mexican free-tailed bat *Tadarida brasiliensis*		Entrapment if not excluded prior to demolition and abandonment activities. Loss or roosting sites.	1895
Yuma myotis *Myotis yumanensis*		Entrapment if not excluded prior to demolition and abandonment activities. Loss or roosting sites.	1895
Unidentified bat		Entrapment if not excluded prior to demolition and abandonment activities. Loss or roosting sites.	480, 484, 488, 535, 1202, 1204, 1537, 1823, 1836, 1895, 1952, 1953, 1957, 1958, 1982, 1992, 1995

† FE – Federal Endangered Species SE – California Endangered Species MBTA – Protected under the Migratory Bird Treaty Act
CSC – California Species of Special Concern

4.2.1.2. Wildlife Species

Because activities would be restricted to the buildings and intervening vegetation within each site, and would not extend beyond a 30-foot radius surrounding each building site, effects to wildlife species would be restricted to individuals that are present within the affected areas, and to some extent, noise disturbances to species that occur near each site. The loss of intervening vegetation within each site, as well as the loss of vegetation immediately adjacent to the buildings would not be considered an adverse effect given the availability of ample habitat in the surrounding area.

No critical habitat for wildlife species exists at any of the sites. No federal threatened or endangered wildlife species are known to occur at any of the buildings and sites.

Noise Disturbances

Wildlife, including amphibians, reptiles, mammals and birds, present in the area could be affected by deconstruction and demolition noise. Wildlife response to noise can be physiological or behavioral. Physiological responses can range from mild, such as an increase in heart rate, to more damaging effects on metabolism and hormone balance. Behavioral responses to man-made noise include attraction, tolerance, and aversion. Each has the potential for negative and positive effects, which vary among species and among individuals of a particular species due to temperament, sex, age, and prior experience with noise. Responses to noise are species-specific; therefore, it is not possible to make exact predictions about hearing thresholds of a particular species based on data from another species, even those with similar hearing patterns.

Reptile and amphibian hearing is poorly studied. However, reptiles and amphibians are sensitive to vibrations, which provide information about approaching predators and prey. Vibration and noise associated with demolition and abandonment activities would potentially cause short-term disturbance to amphibians and reptiles. These impacts would be considered short-term and would not be considered of a magnitude to result in adverse impacts to populations within the vicinity of the project area.

Potential adverse impacts to birds resulting from demolition activities and human generated noise include disruption in foraging, roosting, and courtship activities. Birds would be expected to move away from the area of disturbance during project activities. However, once activity ceases, birds would be likely to return to the area.

The MBTA provides federal protection to all native avian species, their nests, eggs, and unfledged young. Activities associated with the demolition and abandonment of buildings would result in short-term noise disturbances, which may temporarily disrupt foraging and roosting activities of individual birds. If activities occur during the breeding season for avian species, they have the potential to disrupt breeding activities including courtship, incubation and brooding. These impacts would be considered short-term and would not be considered of a magnitude to result in adverse impacts to populations within the vicinity of the project area.

Avian surveys in the vicinity of individual sites immediately preceding the initiation of project activities would identify the presence of any nests that may be subject to noise disturbance. Monitoring during project implementation would identify any potential disturbance so measures could be implemented to avoid adverse effects.

Potential noise related impacts to mammalian species during project activities would include disruption of normal activities due to noise and ground disturbances. These impacts would be considered short-term and would not be considered of a magnitude to result in adverse impacts to populations within the vicinity of the project area.

Demolition and Abandonment Activities

Some reptile and amphibian species could occur within the habitats immediately adjacent to buildings and in the intervening vegetation within each site. A survey immediately preceding the start of project activities at each of the sites would provide the opportunity to relocate any individuals present within the area to suitable habitat adjacent to but outside project boundaries.

Some of the buildings proposed for demolition and abandonment have been identified as nesting and roosting sites, or potential nesting and roosting sites, for a number of native avian species. Should demolition of any of the buildings identified in Table 4-1 and Appendix B, be slated to occur between January and August, nesting native birds could be encountered. To avoid adverse impacts to avian species, demolition plans for structures with documented birds would either (a) schedule demolition outside the breeding season for the species identified within the specific

structures or (b) develop a plan that identifies specific exclusion measures to be implemented *prior to the beginning of the breeding season* when the demolition would occur.

The habitats immediately adjacent to buildings and intervening vegetation within each site provide suitable nesting habitat for a variety of avian species. Should demolition and abandonment activities occur between February and August, nesting native birds could be encountered. Avian surveys immediately preceding the initiation of project activities would identify the presence of any nests. If nests of bird species protected under the MBTA were found within vegetation that would be removed during project implementation, no clearing would occur until the eggs are hatched and the young fledged. If nests were found near to but outside the area of direct disturbance, they would be monitored for potential disturbance resulting from noise.

Bats are the most important natural predators of night-flying insects. Despite the valuable role bats play in our ecosystem, losses are occurring at high rates worldwide. Ten of the 24 bat species that occur in California are currently classified as Species of Special Concern, meaning that they have low or declining numbers of individuals, or low, scattered or highly localized populations that require active management to prevent them from becoming threatened or endangered species. Nine bat species are known to occur on Vandenberg AFB, and an additional six species are expected based on historical records. Of these species, three are considered Species of Special Concern by the state of California. To the extent possible, Vandenberg AFB protects all bat roosts that occur within its boundaries. Buildings with documented bat roosts, or potential for bat roosts to exist are included in Table 4-1 and Appendix B. To prevent entrapment and injury to roosting bats, demolition plans for structures with documented bats would either (a) schedule demolition outside the breeding season for the species identified within the specific structures or (b) develop a plan that identifies specific exclusion measures to be implemented *prior to the beginning of the breeding season* when the demolition would occur.

4.2.2. No-Action Alternative

Under the No-Action Alternative no demolition or abandonment activities would take place and no impacts to biological or jurisdictional wetland resources would occur. However, if buildings were not demolished or made safe for abandonment, they would deteriorate over time, and possibly suffer various degrees of structural failure, up to and including total collapse. If materials from deteriorating or collapsed buildings were not appropriately managed, significant health and safety impacts could result. Abandoned, deteriorating buildings have the potential to attract vectors or result in conditions that could pose a risk to human health and the environment, including wildlife species that may become entrapped.

4.3. Cultural Resources

Cultural resources would be adversely affected if the Proposed Action would cause loss of the value or characteristics that qualify the resource for listing on the NRHP, or if the proposed action substantially alters the natural environment or access to it in such a way that traditional cultural or religious activities are restricted. Cultural resources could also be adversely affected if important traditional viewsheds are altered. The criteria used to evaluate the significance of cultural resources and to assess potential adverse project effects are set forth in the National Historic Preservation Act (NHPA) of 1966 (as amended). Associated implementing regulations include 36 CFR 60 and 800.

The following sections discuss the consequences of the Proposed Action and the No-Action Alternative on cultural resources within or potentially within the APE. The Proposed Action would comply with all relevant authorities governing cultural resources, including Section 106 of the NHPA and AFI 32-7065. In the event that previously undocumented cultural resources are discovered during construction activities, procedures established in 36 CFR 800.13 would be followed.

4.3.1. Proposed Action

Under the Proposed Action, buildings would be either demolished above ground surface or partially demolished and abandoned in place. Abandoned buildings would be secured to ensure that they are safe and that humans and wildlife cannot accidentally get trapped.

Methods of demolition would vary by building type, but in all cases the intent is to remove the existing aboveground structures flush to the adjacent ground surface. Utilities would be abandoned in place, and all roads, driveways, and parking lots would remain. Consequently, ground disturbance will be avoided or minimized.

For purposes of discussing potential effects to cultural resources from the Proposed Action, the buildings to be demolished are grouped into 21 complexes. Cultural resources identified in and near each complex are discussed in Section 3.1 of this PEA.

Table 4-2 summarizes the complexes and associated cultural resources. Volume 5 of the Vandenberg AFB Integrated Cultural Resources Management Plan (ICRMP) indicates that 60-meter buffers should be established around archaeological sites that have not had boundaries adequately defined, and that a 30-meter buffer should be established around sites where boundaries have been adequately defined. Therefore, Table 4-2 lists archaeological sites and isolated artifacts that are within 60 meters of any building to be demolished.

As listed in Table 4-2, most of the 21 complexes have no archaeological sites or isolated artifacts within 60 meters. None of the buildings in these complexes are eligible for the NRHP. Demolishing or abandoning the buildings in these locations would not alter the natural environment or alter traditional viewsheds. Consequently, demolition of these buildings would not affect cultural resources and mitigation measures are not required.

Eight of the 21 complexes either have buildings that are eligible for the NRHP, or have archaeological sites or isolated artifacts within 60 meters. Each of these complexes is examined below.

GERTS Facilities

Based on the recommendations offered by USACERL, in July 2001 Vandenberg AFB officially determined that the three buildings to be demolished (470, 480, and 488) were eligible for the NRHP. All three are significant for their distinctive physical characteristics and their historic function.

By the time of the eligibility determination, the significant portion of Building 488 had burned in an accidental fire. Buildings 470 and 480 were not damaged in the fire. To mitigate the negative effects of the fire and the upcoming demolition, Vandenberg AFB proposed a finding of No Adverse Effect with the following conditions:

- Prior to demolition of Buildings 488, 470, and 480, a "forensic" recordation (to HABS standards) would be conducted of the GERTS facilities. This effort would be forensic in nature because it would involve documentary research (e.g., publication of existing plans and photographs, collection of oral histories, etc.) and external photographs of Building 488. For the smaller rate receiver stations (470 and 480), more complete photographic recordation is possible and would be accomplished (Westfall 2001).

SHPO concurred with the Vandenberg AFB determination in a response dated 2 January 2002, thus concluding Section 106 consultation. Recordation as described above is still required prior to demolition as part of the finding of No Adverse Effect with conditions.

Building 535

CA-SBA-1145/H is within 50 meters of Power Plant No. 6 (Building 535) and thus within the 60 meter buffer. However, previous archaeological studies at the site (Gibson 1983; Maschner et al. 1991; Lebow et al. 2003; Shilz 1985; Snethkamp and Munns 1991) have demonstrated that it does not extend to Power Plant No. 6. Consequently, it will not be affected by demolition of the power plant and no mitigation measures are necessary.

SLC-4

Two of the buildings (733 and 734) to be demolished and a portion of the security fence are within archaeological site CA-SBA-537/1816, which has been determined eligible for the NRHP. Extensive archaeological data recovery excavations were completed to mitigate the effects of the fence installation (Environmental Solutions 1990b), so no additional studies are necessary for fence removal, particularly since the fence would be removed without ground disturbance by cutting rather than excavating the posts.

Archaeological testing was completed to assess the adverse effects of Heritage Program building demolition. That effort found that: *"…demolition of the selected buildings will not adversely affect the CA-SBA-537/1816 site complex for three interrelated* reasons*. First, the site integrity inside the launch complex is very*

Table 4-2.
Summary of environmental consequences for Cultural Resources.

Building Complex	Buildings	NRHP-Eligible Buildings	Archaeological sites within 60 meters	Isolated Artifacts within 60 meters	Environmental Consequences	Recommendations/ Mitigation Measures
Oak Mountain Booster Station and Water Storage Tank	98, 99	None	None	None	None	None
GERTS Facilities	470, 480, 484, 488	470, 480, 488	None	None	SHPO consultation complete, resulting in a finding of No Adverse Effect with conditions.	Recordation of all three buildings to HABS standards.
Power Plant No. 6	535	None	CA-SBA-1145/H	None	None; CA-SBA-1145/H does not extend to the power plant.	None
250K-Gallon Water Tank	702	None	None	None	None	None
SLC-4	713, 714, 715, 716, 717, 719, 722, 725, 726, 729, 733, 734, 736, 737, 738, 739, 746	None	CA-SBA-537/1816	None	None; the site's significant qualities will not be affected by demolition of the buildings and the fence.	Archaeological and Native American monitoring during building and fence demolition.
SLC-3	768	All of SLC-3	None	VAFB-ISO-209	None. HABS/HAER recordation was completed for the buildings. The location of the isolated artifact has no integrity.	None
X-Ray Facility	946	None	None	VAFB-ISO-223, -394, -395	None; testing found that all three artifacts are truly isolated and thus not significant.	None
Santa Ynez Water Plant	1200, 1201, 1202, 1204, 1205, 1209	None	CA-SBA-1891	None	None; the site's significant qualities will not be affected by demolition of the buildings.	None
Re-entry Vehicle Area Water Tank Building	1505	None	None	None	None	None
576 FLTS Munitions Storage	1537, 1538, 1539	None	None	None	None	None
ABRES A Facility	1783	None	None	None	None	None
ABRES B Facility (Atlas 576-B and Atlas 576-F Launch Complexes)	1823, 1825, 1830, 1835, 1836	None	CA-SBA-1778, CA-SBA-1070/1070E/1071	None	None. CA-SBA-1778 is not eligible for the NRHP. The significant qualities of CA-SBA-1070/1070E/1071 will not be affected by demolition.	Fence along the edge of Tod Road to restrict cars and pedestrian traffic to the road.
395-A Launch Facility	1853, 1874	None	None	None	None	None
Old Titan I/II Launch Test Facility	1885	None	None	None	None	None
Atlas 576-C	1895	None	None	None	None	None

Building Complex	Buildings	NRHP-Eligible Buildings	Archaeological sites within 60 meters	Isolated Artifacts within 60 meters	Environmental Consequences	Recommendations/ Mitigation Measures
RF Hut 1	1952	None	None	None	None	None
RF Hut 2	1953	None	None	None	None	None
RF Hut 3	1982	None	CA-SBA-512	None	None. Demolition will avoid ground disturbance and will be limited to the superstructure; the foundation and all associated infrastructure will be abandoned in place.	Only rubber-tired vehicles and equipment will be used during demolition. Vehicles and motorized equipment will be restricted to the existing gravel roads and to the graveled area surrounding the hut. An archaeologist and a Native American will monitor demolition to ensure the archaeological deposit is not damaged.
RF Hut 5	1995	None	None	None	None	None
RF Hut 7	1958	None	CA-SBA-940	None	None. The building is outside the site boundaries and demolition will avoid ground disturbance; the foundation and all associated infrastructure will be abandoned in place.	Only rubber-tired vehicles and equipment will be used during demolition. Vehicles and equipment will be restricted to the graveled area surrounding the hut. An archaeologist and a Native American will monitor demolition to ensure the archaeological deposit is not damaged.
RF Hut 8	1957	None	None	None	None	None
RF Hut 9	1992	None	CA-SBA-759	None	None. The building is outside the site boundaries and demolition will avoid ground disturbance; the foundation and all associated infrastructure will be abandoned in place.	Only rubber-tired vehicles and equipment will be used during demolition. Vehicles and equipment will be restricted to the graveled area surrounding the hut. An archaeologist and a Native American will monitor demolition to ensure the archaeological deposit is not damaged.
Staging Tank at Firefighter Road	20220	None	None	None	None	None

poor. Second, the density of cultural materials found in intact sediments around the buildings to be demolished is low and the cultural assemblage lacks diversity. This low density and lack of diversity does not reflect the characteristics identified during the previous investigations and severely limits the data potentials. Third, the massive amount of archaeological excavations previously completed at the site recovered substantial data, and additional excavations in the vicinity of buildings to be demolished would not likely yield new important data (Lebow et al. 2005:iv)."

No further archaeological studies are necessary at CA-SBA-537/1816 because the site's significant qualities will not be adversely affected by the demolition work. An archaeologist and a Native American should monitor demolition of the two buildings and the security fence to ensure that demolition is restricted to the proposed activities and to ensure that previously undetected, significant site deposits are not affected during demolition (Lebow et al. 2005).

Building 768 (SLC-3)

The U.S. Air Force, in consultation with the SHPO, has determined the entire SLC-3 complex, including both SLC-3W and SLC-3E, eligible for the NRHP. In the early 1990s, a proposed Atlas II project at SLC-3 was considered an adverse effect to the historic property. To mitigate that effect, a HABS/HAER study was undertaken in 1993, resulting in a comprehensive, four-volume document. A Memorandum of Agreement (MoA) prepared in 1993 addressed the mitigation issue for the Atlas II project. Subsequently, SLC-3 was considered for the EELV program, which was again considered an adverse effect. No additional documentation was required to mitigate the impacts, and a new MoA was prepared. That MoA stipulates that "*the HABS/HAER recordation of SLC-3...has satisfactorily taken into account the effects of the undertaking on SLC-3, and that no other measures to minimize or mitigate the effects of the undertaking on SLC-3 are required.*" Because the impacts to SLC-3 from the Heritage Program demolition are less than those that were proposed under the EELV, no additional effort to minimize or mitigate the impacts from demolition work is necessary.

An isolated artifact, VAFB-ISO-209, is just within the 60 meters of Building 768. Shovel test units excavated at the location of this isolated artifact found that the location has no integrity (York 1992). Consequently, no additional archaeological studies or mitigation measures are necessary.

Building 946

Three isolated artifacts (VAFB-ISO-223, -394, and -395) are within 60 meters of Building 946. Archaeological studies at the plotted locations of these artifacts determined that the artifacts are truly isolated and do not represent archaeological sites (Lebow et al. 2005). Consequently, no additional archaeological studies or mitigation measures are necessary.

Santa Ynez Water Plant

CA-SBA-1891, which has been determined eligible for the NRHP, is located adjacent to the Santa Ynez Water Treatment Plant. Archaeological testing for the Heritage Program demolition project probed along the edge of the water treatment plant adjacent to the site and found that the site does not extend into the demolition area (Lebow et al. 2005). As a result, demolition of the buildings would not adversely affect the site's significant qualities. No additional archaeological studies or mitigation measures are necessary.

ABRES B Launch Complexes

No archaeological sites or isolated artifacts are within 60 meters of the buildings to be demolished in the Atlas 576-B Launch Complex (Building 1823, 1824, and 1830). Further, none of the buildings in this complex are considered eligible for the NRHP.

Two archaeological sites are completely or partially within the Atlas 576-F Launch Complex (Building 1836). CA-SBA-1778 is entirely within the facility and surrounds Building 1836. However, testing for the MX missile program found that the site lacked integrity (Chambers Consultants and Planners 1984:3-40) and it was subsequently determined ineligible for the NRHP. Consequently, no additional archaeological studies or mitigation measures are necessary for CA-SBA-1778.

CA-SBA-1070/1070E/1071 extends partially into the Atlas 576-F Launch Complex. Testing for the Heritage Launch Program Demolition project found that the site is a significant contributing element to the San Antonio Terrace Archaeological District (i.e., it is eligible for the NRHP). However, the site is more than 200

meters from Building 1836 and its significant qualities will not be affected by demolition of the building (Lebow et al. 2005).

Construction fencing would be installed along the eastern edge of Tod Road—which provides access to the Atlas 576-F Launch Complex—to ensure that vehicles and pedestrians stay on the road for the duration of the demolition work. The fencing would extend from the security fence south for 70 meters to restrict cars and pedestrians to the road, and no more than three meters from the edge of the pavement. Archaeologists and a Native American familiar with the site would direct and assist in the installation of the protective fencing.

Communication Huts

Three of the seven communication huts proposed for demolition are in or near archaeological sites. RF Hut 3 (Building 1982) is within CA-SBA-512. RF Hut 7 (Building 1958) is approximately 30 meters from CA-SBA-940; and RF Hut 9 (Building 1992) is within 25 meters of CA-SBA-759. In these three locations, demolition at each communication building would be restricted to the superstructure itself. All foundations would be left in place, as would all subsurface infrastructure such as buried utilities. Consequently, ground disturbance would be avoided.

To ensure that no archaeological resources are affected during demolition of RF Huts 3, 7, and 9, only rubber-tired vehicles and equipment would be used during demolition. Further, motorized vehicles and equipment would be restricted to existing driveways, roads, and the graveled surface surrounding the huts. An archaeologist and a Native American would monitor demolition at these three communication huts to ensure that the archaeological deposits are not inadvertently affected.

4.3.2. No-Action Alternative

Under the No-Action Alternative, none of the Heritage Program buildings would be demolished. Therefore, the No-Action Alternative would not affect cultural resources.

4.4. Hazardous Materials and Hazardous Waste Management

Potential impacts as a result of hazardous materials and hazardous waste are evaluated using federal, state and local regulatory requirements, contract specifications, and base operating constraints, as outlined in Chapter 3. Hazardous materials management requirements are found in federal and state EPA and OSHA regulations, demolition contract specifications and the Vandenberg AFB HMMP (30 SWP 32-7086). Hazardous waste management requirements are found in federal, state and local regulations, demolition contract specifications and the Vandenberg AFB HWMP (30 SWP 32-7043A). Non-compliance with applicable regulatory requirements, human exposure to hazardous materials and wastes, or environmental release above permitted limits, would be considered adverse impacts.

4.4.1. Proposed Action

The demolition contractor would be subject to hazardous materials and waste management regulations as required by federal, state and local laws and regulations, and would follow procedures as outlined in the Vandenberg AFB HMMP (30 SWP 32-7086) and Vandenberg AFB HWMP (30 SWP 32-7043A).

Implementing the Proposed Action would require the use of hazardous materials to accomplish demolition activities. As described in Chapter 3, these hazardous materials, including explosive materials, are commonly used for deconstruction and demolition projects, and would be the same types as currently used and managed on Vandenberg AFB. Because the Proposed Action would be spread over several years and only a small number of demolition teams would be working at any one time, there would not be a significant increase in the amounts of hazardous materials present on Vandenberg AFB. Thus no significant adverse impacts are anticipated.

Potential adverse effects at demolition sites could result from accidental releases of POL from vehicle and equipment leaks, and from hazardous wastes generated by abatement actions. All hazardous wastes would be properly managed and disposed of in accordance with applicable federal, state and local hazardous waste regulations, and the Vandenberg AFB HWMP (30 SWP 32-7043A). Prior to project

implementation, the demolition contractor would prepare a hazardous materials Spill Prevention and Response Plan and obtain concurrence from 30 CES/CEV. All hazardous wastes would be managed either during release response and clean-up, or during abatement removal actions. Vandenberg AFB has an RCRA-permitted EOD range authorized for the disposal of propellants, explosives, and pyrotechnics.

Compliance with all applicable federal, state and local regulations, rules and requirements, and applicable Vandenberg AFB plans, would govern all actions associated with implementing the Proposed Action, and minimize the potential for adverse effects.

Based upon the engineering analysis completed by Jacobs Engineering (Jacobs 2004) for the first increment of buildings proposed for demolition, the proposed additional engineering analyses to be completed as fiscal year funds become available and before implementing the Proposed Action, the proposed methods for accomplishing building demolition, and the measures presented below, no significant adverse impacts for hazardous materials or hazardous waste would occur.

- All hazardous materials would be properly identified and used in accordance with manufacturer's specifications to avoid accidental exposure to or release of hazardous materials required to operate and maintain demolition equipment.
- All equipment would be properly maintained and free of leaks during operation. All necessary equipment maintenance and repairs would be performed in predesignated controlled, paved areas to minimize risks from accidental spillage or release.
- The explosive demolition contractor would develop and provide 30 CES with an approved explosive demolition plan. Only the needed amount of explosives required to accomplish explosive demolition of specific buildings would be brought to the project site
- Hazardous materials surveys and abatements prior to deconstruction and demolition would avoid accidental exposure and ensure proper management of hazardous materials presently managed in-place (ACM, LBP, PCBs, dioxins, and treated wood).
- Proper disposal of hazardous waste would be accomplished through identification, characterization, sampling and analysis of wastes generated.
- All demolition actions would be coordinated with the 30 CES/CEVR so as not to interfere with IRP actions, damage IRP equipment or monitoring wells, or expose workers to contamination.

4.4.1.1. Asbestos Abatement Management

In addition to the regulations described above for hazardous materials and waste management, the evaluation of potential impacts associated with the presence of ACM also includes disposal requirements, particularly as applied to the disposal of non-friable asbestos in the Base Landfill. The Vandenberg AFB AMP (30 SWP 32-1052A) and local APCD rules, as applicable to National Emissions Standards for Hazardous Air Pollutants (NESHAPS) for asbestos, would also be criteria for assessing asbestos survey, abatement, management, and disposal actions. Non-compliance with applicable regulatory requirements, human exposure to ACM, or environmental release above permitted limits, would be considered adverse impacts.

An Asbestos Work Plan would be prepared by the demolition contractor and approved by 30 CES/CEVC. In addition, all ACM would be abated prior to demolition. Personal protective clothing and equipment are necessary to protect workers against asbestos hazards that may be encountered at abatement sites. Friable asbestos waste generated by the demolition contractor would be disposed of following Vandenberg AFB hazardous waste management procedures, wherein the demolition contractor obtains the appropriate container or portable disposal unit and provides 30 CES/CEVC 48-hour notice to approve the manifest to a certified landfill. Friable asbestos that has been sampled, analyzed, and characterized as hazardous waste would have paperwork processed through the Consolidated CAP and disposed of by a Vandenberg AFB-approved contractor. Non-friable asbestos may be disposed of at the Base Landfill provided contract specifications allow it, and the demolition contractor follow requirements and procedures as found in the Vandenberg AFB *Solid Waste Management Plan* (SWMP; 30 SWP 32-7042). Implementing these measures should ensure no adverse effects result from ACM.

4.4.1.2. Lead-Based Paint Management

In addition to the regulations described above for hazardous materials and waste management, the evaluation of potential impacts as a result of LBP containing materials also includes the Vandenberg AFB LBPMP (30 SWP 32-1002) and applicable local APCD rules. These regulations, rules and Vandenberg AFB LBPMP (30 SWP 32-1002) would also be criteria for assessing LBP survey, abatement, management and disposal actions. Non-compliance with applicable regulatory requirements, human exposure to LBP containing materials, or environmental release above permitted limits, would be considered adverse impacts.

The demolition contractor would sample all buildings proposed for demolition for lead content. Personnel performing demolition activities would be trained to recognize hazards and protect themselves and others from lead exposure. LBP abatement would be accomplished prior to structural demolition. Proper segregation of demolition debris would be used to avoid unnecessary contamination due to LBP. Wastes that are hazardous due to metals (lead) toxicity would be processed following Vandenberg AFB HWMP (30 SWP 32-7043A) procedures for eventual offsite disposal. Wastes that may contain LBP, have been analyzed, and are determined to be non-hazardous, may be disposed of in the Base Landfill, provided Vandenberg AFB SWMP (30 SWP 32-7042), federal and state regulatory conditions have been met. Implementing these measures should ensure no adverse effects result from LBP containing materials.

4.4.1.3. Polychlorinated Biphenyls and Dioxins

The regulations described above for hazardous materials and waste management are used to evaluate potential impacts as a result of PCB and dioxin containing materials. These regulations, rules, and Vandenberg AFB plans would also be criteria for assessing PCB and dioxin survey, abatement, management, and disposal actions. Non-compliance with applicable regulatory requirements, human exposure to PCB and dioxin containing materials, or environmental release above permitted limits, would be considered adverse impacts.

Each building proposed for demolition would be surveyed for PCBs in oils, coatings and electrical devices. Devices or wastes containing PCBs would be managed in accordance with the Vandenberg AFB HWMP (30 SWP 32-7043A), federal, state and local environmental regulations. Should any transformer be removed, the removal action would be coordinated with the 30 CES Utilities Electrical Shop to account for removal, and to verify PCB presence or content in the removed transformer. Implementing these measures should ensure no adverse effects result from PCB and dioxin containing materials.

4.4.1.4. Installation Restoration Program

Potential IRP impacts are evaluated using DOD and Air Force guidance, and the Federal Facilities Site Remediation Agreement (FFSRA), as negotiated between Vandenberg AFB and the regulatory agencies with oversight of Vandenberg AFB IRP activities. Non-compliance with the FFSRA, human exposure to contaminants, or environmental release above permitted limits, would be considered adverse impacts.

Some of the buildings proposed for demolition are located on or adjacent to IRP sites and AOCs. Thus, demolitions could affect IRP equipment and operations. Since the majority of IRP remediation actions are below grade and proposed demolitions would be at or above grade, the possibility of program interactions would be limited, as would any adverse effects. Demolition and removal actions at certain sites have the potential to result in adverse effects when the removal of concrete, asphalt or other structural elements expose contaminated subsurface layers to increased rainwater infiltration or expose subsurface layers more directly to solar heating, with subsequent possible changes in rates of volatilization. To avoid potential adverse effects, all demolition actions would be coordinated with the 30 CES/CEVR so as not to interfere with IRP actions, damage IRP equipment or monitoring wells, or expose workers to contamination.

4.4.2. No-Action Alternative

Under the No-Action Alternative there would be no demolitions or demolition equipment. No adverse effects resulting from hazardous materials or the generation of hazardous waste would occur. Hazardous materials currently “managed in-place” would remain, and abatements of ACM, LBP, PCBs, and dioxins would not occur. However, these materials would remain and, as a result of building deterioration over time, have the potential to be released into the environment, resulting in

adverse effects on human health and safety, and the environment.

4.5. Human Health and Safety

The demolition contractor would comply with OSHA, AFOSH regulations, and other recognized standards and applicable Air Force regulations or instructions. Restricted public access to the proposed demolition sites would be provided through use of signs and fencing. The demolition contractor must also provide for the health and safety of workers and all subcontractors who may be exposed to their operations or services. The contractor must submit a health and safety plan to the base and appoint a formally trained individual to act as safety officer. The appointed individual would be the point of contact on all problems involving job site safety. During performance of work, the contractor must comply with all provisions and procedures prescribed for the control and safety of demolition team personnel and visitors to the job site.

4.5.1. Proposed Action

Demolition sites, in general, can be dangerous to workers and the public. For the activities associated with the Proposed Action, the demolition contractor would comply with Federal-OSHA, and AFOSH regulations, as required and appropriate, to provide for the health and safety of workers, subcontractors, and visitors who may be exposed to the operations, hazardous materials in use, and hazardous wastes generated and transported. Therefore, human health and safety would not be adversely impacted by general demolition hazards.

Biological hazards, including vegetation (i.e., poison oak and stinging nettle), animals (i.e., insects, spiders, and snakes), and disease vectors (i.e., ticks, rodents), exist at and around the various buildings proposed for demolition or abandonment, and have the potential to adversely impact the health and safety of demolition personnel. Adherence to federal OSHA and AFOSH regulations would minimize the exposure of workers to these hazards.

Health and safety guidelines that would be followed in the handling and transportation of hazardous materials and waste are described in Section 4.4 of this PEA.

4.5.1.1. Unexploded Ordnance

EOD is required to review demolition plans for each building for which demolition is planned, whether or not it is located in an UXO area. Special precautions need to be taken in certain areas of Vandenberg AFB that were used as practice ranges for artillery firing, referred to as areas of potential UXO. Buildings 470, 480, 484, 488, 702, 713, 714, 715, 716, 717, 719, 722, 725, 726, 729, 733, 734, 736, 737, 738, 739, 746, 768, 786, 946, 1505, 1537, 1538, 1539, 1823, 1830, 1835, 1836, 1825, 1861, 1895, and 20220, are in these zones (USAF 2004). Coordination with EOD prior to implementing the Proposed Action should ensure no adverse effects on human health and safety occur.

4.5.1.2. Noise

According to regulations of the federal OSHA, employees should not be subjected to sound exceeding an L_{eq} of 90dB for an eight hour period. This sound level increases by five dB for with each halving of time (e.g., four hour period at 95dB). Exposure up to a L_{eq} of 115dB is permitted for a maximum of only 15 minutes during an 8-hour workday and no exposure above 115dB is permitted. For this analysis, OSHA standards are used as the “not to exceed” criteria as they are the most appropriate standards available. Furthermore, for this document “employees” would refer instead to personnel working on or visiting Vandenberg AFB that are not associated with Proposed Action demolition and abandonment activities.

The Proposed Action would temporarily increase the ambient noise levels within the project area and in neighboring areas during project implementation activities. Relatively continuous noise would be generated during activities such as systematic disassembly, cutting, wrecking, felling, and transportation of materials. These continuous noise levels are generated from equipment that has source levels (at one meter) ranging from approximately 70 to 110 dB. As a sound source gets further away, the sound level decreases. This is called the attenuation rate. The rates are highly dependent on the terrain over which the sound is passing and the characteristics of the medium in which it is propagating. The rate used in these estimates was a decrease in level of 4.5dB per doubling of distance. This average rate has been shown to be an accurate estimate from field data on grassy surfaces (Harris 1998). At 50 meters these levels range from 50 to 95 dB.

Typical noise levels of heavy construction equipment are presented in Table 4-3.

Impulsive noise would be generated during activities such as blasting, breaking, and hammering. The impulsive noise from blasting is potentially a hazard to hearing if the unweighted peak levels exceed 140 dB, and would still be considered a potential annoyance at lower levels. OSHA standards do not permit exposure levels above 115 dB. Explosives noise is highly dependent on the amount of energy converted to the acoustic pressure wave, the type of explosive material used, the nature of the explosion and the degree of confinement. An example of the peak overpressures produced from a free air detonation of one kilogram of trinitrotoluene (TNT) can be predicted from the American National Standards Institute (ANSI) formula (Figure 4-1). Explosives that have different energy content will yield different peak overpressures.

Vibration resultant from explosives during deconstruction/demolition activities has been shown to be very low. Excerpts from the U.S. Air Force, 45th Space Wing SLC-13 Plan, and the SLC-41 Demolition Plan states: "*The ground vibrations will be well within the Bureau of Mines standards of 2" per second. At a distance of 150' from the falling structures, we predict that the ground vibrations should be under 0.25 inches/seconds. The ground vibration from explosive demolition activities comes from the falling structures impacting the ground, not the actual detonation of the explosives. The demolition activities will produce a fraction of the vibration compared to the ground vibration that a rocket launch would produce".*

Since buildings proposed for demolition are not located adjacent to inhabited areas, there are likely not many sensitive receptors in the vicinity of the Proposed Action sites. Therefore, adverse impacts as a result of noise are expected to be minimal and less than significant.

4.5.2. No-Action Alternative

Under the No-Action Alternative, no buildings would be demolished or abandoned as described in Chapter 2 of this PEA. In the interim, their structural conditions would continue to deteriorate and possibly suffer various degrees of structural failure, up to and including total collapse. If the buildings, or debris from deteriorating buildings, were not appropriately managed, significant health and safety impacts could result. Abandoned, deteriorating buildings have the potential to attract vectors or result in conditions that could pose a risk to human health and the environment. For example, people entering or approaching abandoned facilities could be injured if structural failure were to occur; and environmental damage could occur if hazardous materials such as mercury and phosphorus from broken fluorescent light tubes were released into storm water during structural deterioration.

Table 4-3.
Noise levels of heavy construction equipment.

Equipment Item	Maximum Noise Level (dBA) at 15 meters (50 feet)
Backhoe (48 HP)	78
Dumpster truck (40 foot)	84-87
Front end loader (1.5 cubic yards)	77-82
Track loader (2.5 cubic yards)	82-86
Dozer (demolition) (200 HP)	84
Dozer (grading) (300 HP)	86
Track hoe (3/4 cubic yard)	77
Water truck (3,000 gallons)	81-84
Dump truck (40 ton)	84-87
Scraper (14 cubic yards)	83-86
Skid steer loader	81-82
Paver (130 HP)	82
Road grader (15 ton)	79-83
Asphalt truck (16 ton)	81-84
Cement truck	81-84
Trencher (12 HP)	72
Wheeled trencher (40 HP)	77

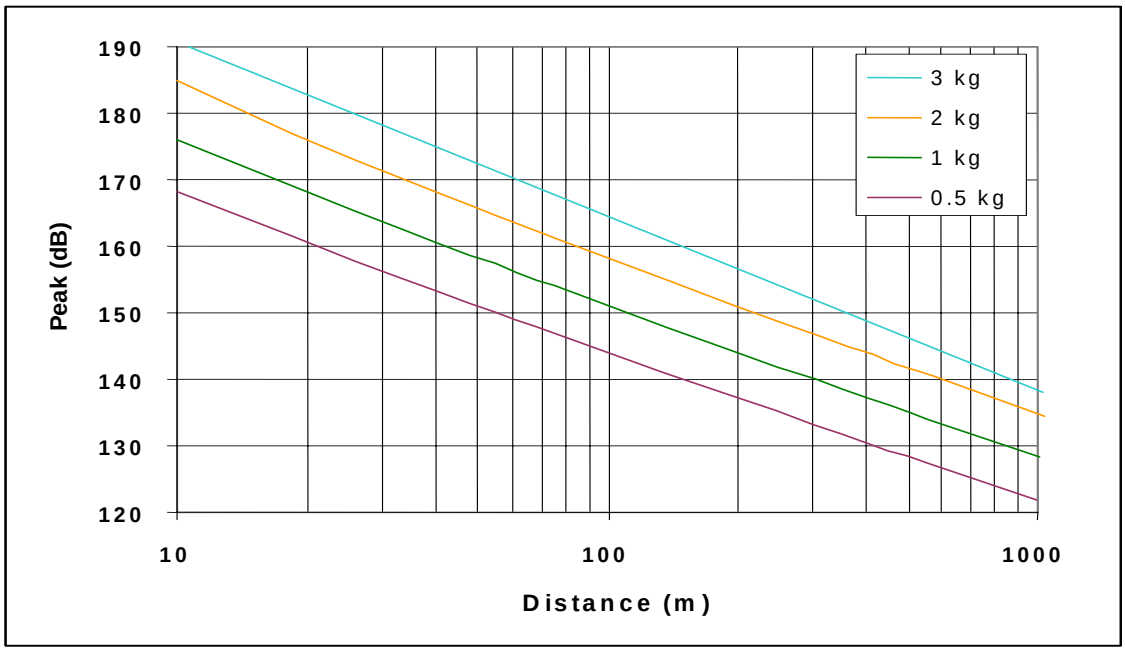

Figure 4-1. Predicted free-air unweighted peak overpressures from TNT.

4.6. Land Use and Aesthetics

Factors considered in the evaluation of the environmental consequences of implementing the Proposed Action and the No-Action Alternative for land use include:

- Restriction to development of facilities on Vandenberg AFB.
- Public accessibility to and interactions with recreational areas in the vicinity of the project area and Vandenberg AFB.
- The potential for a decrease in available agricultural lands near the project area.
- Aesthetic values as described under the CZMA and the CCA.

4.6.1. Proposed Action

The demolition and abandonment of buildings under the Proposed Action would not result in a conversion of prime agricultural land or cause a decrease in the utilization of land. In addition, the proposed project is not expected to adversely affect recreation or aesthetics.

The Proposed Action would occur within presently developed land. No adverse impacts to open space land are anticipated because all access and transportation would be accomplished through existing paved and unpaved roadways and all demolition and abandonment activities would occur within boundaries of developed areas. Demolition and abandonment of buildings under the Proposed Action would not result in restrictions to development of facilities or activities associated with the Vandenberg AFB mission.

Coastal Zone Management

The CZMA and CCA mandate that the scenic and visual qualities of coastal areas be considered and protected as a resource of public importance. Some of the buildings proposed for demolition and abandonment under the Proposed Action are located within the California Coastal Zone (see Table 3-6). However, since these buildings presently exist within already developed areas and their removal would not affect the scenic and visual qualities of coastal areas, and may in some instances enhance these, no adverse impacts to the coastal zone, as defined by the CZMA and CCA, are anticipated. Coordination with the California Coastal Commission is required

for development within the coastal zone. The Air Force will coordinate the Proposed Action with the California Coastal Commission in compliance with the Coastal Zone Management Act.

4.6.2. No-Action Alternative

Under the No-Action Alternative, no buildings would be demolished or abandoned as described in Chapter 2 of this PEA. Thus, no changes to land use and aesthetics would result.

4.7. Solid Waste Management

Solid waste impacts are evaluated using federal, state, and local regulatory requirements, permit conditions, contract specifications, Vandenberg AFB Solid Waste Management Plan (30 SWP 32-7042), and operating constraints as outlined in Chapter 3. The current demolition debris diversion requirement is 50%; however, during the course of the Proposed Action diversion requirements for demolition debris could become 75% or higher. Adverse impacts would occur from non-compliance with applicable regulatory requirements or increase in the amount of waste disposed beyond available base waste management capacities, which would result in disposal in other Santa Barbara County landfills. Disposal amounts in the Base Landfill that would cause the base to drop below its currently mandated 50% diversion rate would also be considered an adverse impact.

4.7.1. Proposed Action

Buildings proposed for demolition cover a broad range of structural types with varying composition of materials, and complexity of building structure (Appendix A). The method selected for facility demolition and debris management would differ for each facility and would be selected to optimize reuse and recycle opportunities, and demolition debris diversion (Jacobs 2004). As stated in Chapter 2 of this PEA, all demolitions would use the general, programmatic sequence of procedures and actions of: surveys, abatements, deconstruction, structural demolition, debris and material management, and site restoration. The final project closure action would be an acceptance inspection to ensure contract requirements were met, and that remaining structures, returned to the base after demolition, meet the Base Real Estate criteria as outlined in 30 SWI 32-901, *Facility Closure/Turn-In Procedures*.

Jacobs Engineering (Jacobs 2004) completed an analysis of the processes and actions for solid wastes management for the first group of buildings proposed for demolition (Fiscal Year 2005). As future fiscal year funding becomes available and prior to the start of demolition, Vandenberg AFB would task a contractor to complete engineering studies on buildings as was done in the Jacobs study. Based upon the range of buildings examined in the Jacobs study, it is expected that the buildings on the proposed Demolition List (Appendix A) not yet examined in detail, would be comparable to those facilities already studied. Should any significantly different findings or actions be identified, additional environmental analyses would be completed as required.

The generation of demolition debris, materials and items removed from the buildings during deconstruction has the potential of adversely affecting waste volumes at the Base Landfill, particularly for acceptance of non-friable asbestos and demolition debris that could not be reused, recycled or placed as engineered fill. The demolition contractor would meet the applicable state or local diversion requirements in effect at the time of actual disposal. In addition, although the Base Landfill is permitted for a peak daily tonnage of approximately 400 tons, the demolition contractor would limit daily landfill disposal so the Base Landfill could continue to operate nearer its current daily average disposal tonnage of 35 tons/day. Useable items and material removed during deconstruction would directly impact the RTDS process of the local DRMO, and could indirectly impact regional Defense Logistic Agency RTDS centers. Recyclable solid wastes not managed by base processes would impact local and regional recycling facilities.

The evaluation of potential P2 impacts includes solid waste diversion requirements, particularly as applied to demolition debris. Non-compliance with applicable regulatory requirements or disposal of quantities of solid waste that would cause the proposed project not to meet mandate diversion rates would be considered an adverse impact. The placement of certain items and installed equipment removed from facilities into the DRMO RTDS process would increase the amounts of materials handled above normal operations. Debris would be segregated to

facilitate subsequent P2 options. P2 options would be exercised in the following order: reuse of materials, recycling of materials and then regulatory compliant disposal. The Proposed Action would place demolition debris, as inert engineered fill, at those facilities where concrete basins, wells or other fabricated structures are open to the surface at grade level but have the bulk of their retention volume below grade. The Proposed Action would be to fill these voids following requirements for inert debris engineered fill operation as found in Title 14 of the CCR, Chapter 3, Article 5.9.

The demolition contractor would be required to base his specific Solid Waste Management Plans on the *Demolition and Abandonment of Atlas and Titan Heritage Launch Program Facilities Solid Waste Management Plan Guidelines* included as an appendix to this PEA (Appendix E). Compliance with all applicable federal, state and local regulations, rules and requirements, and applicable Vandenberg AFB plans would govern all actions associated with implementing the Proposed Action and minimize the potential for adverse effects.

Based upon the engineering analysis completed by Jacobs Engineering (Jacobs 2004) for the first increment of buildings proposed for demolition, the proposed additional engineering analyses to be completed as fiscal year funds become available and before implementing the Proposed Action, the proposed methods for accomplishing building demolition, and the measures presented below, no significant adverse impacts for solid waste would occur.

- Using inert debris as engineered fill in the below grade voids that would otherwise remain unfilled or require additional fill to be trucked-in from base borrow pits would minimize the amount of inert debris requiring disposal. Inert debris engineered fill operations must be approved by Santa Barbara County Environmental Services and conducted in accordance with CCR Title 14 Div 7 17288.3, *Inert Debris Engineered Fill Operations*.
- Hazardous materials surveys and appropriate abatement actions would be completed prior to structural demolition to avoid contamination of inert demolition debris.
- Prior to structural demolition, salvageable, reusable, or recyclable materials, items and equipment would be removed to reduce the amount of solid waste disposal.
- Segregating and separately managing the different types of waste during the deconstruction and demolition processes would reduce the amount of solid waste disposal.
- Segregating and processing the different types of demolition debris into sizes, characteristics and specifications identified by local recyclers as acceptable to their authorized processes would reduce solid waste disposal.
- Segregating and processing the different types of demolition debris into sizes, characteristics and specifications for reuse within other Vandenberg AFB projects.
- Using segregated demolition debris, such as residual wood, drywall, roofing, and flooring, as feedstock for grinding to make demolition debris suitable for use as ADC at the Base Landfill would minimize the amount of solid waste disposal.

4.7.2. No-Action Alternative

Under the No-Action Alternative there would be no demolitions; thus no solid waste impacts would occur. However, if buildings were not demolished they would, over time, deteriorate and possibly suffer various degrees of structural failure, up to and including total collapse. This debris would either remain in place, or have to be consolidated, collected, and disposed of appropriately. If the buildings, or debris from deteriorating buildings, were not appropriately managed, significant health and safety impacts could result. Abandoned, deteriorating buildings have the potential to attract vectors or result in conditions that could pose a risk to human health and the environment. For example, people entering or approaching abandoned facilities could be injured if structural failure were to occur; and environmental damage could occur if hazardous materials such as mercury and phosphorus from broken fluorescent light tubes were released into storm water during structural deterioration. In addition, materials would be subject to the elements and would become useless for their original, intended purpose and less amenable to recycling. Hazardous materials in the facilities could also contaminate otherwise usable materials, and result in lesser volumes for recycle

and greater volumes requiring regulatory compliant disposal.

4.8. Transportation

The criteria for determining the significance of project-generated traffic were obtained from Santa Barbara County Planning and Development Department guidelines (SBCPD 1992). Impacts would be considered adverse if:

- The addition of project trips at an intersection causes an increase in the V/C ratio by the value shown in Table 4-4, or the number of project trips using an intersection is greater than the values shown in Table 4-3. Project traffic would use a substantial portion of an intersection(s) capacity where the intersection is currently operating at acceptable levels of service (A-C) but with cumulative traffic would degrade to or approach LOS D (V/C 0.81) or lower. Substantial is defined as a minimum change of 0.03 for intersections that would operate from 0.80 to 0.85 and a change of 0.02 for intersections that would operate from 0.86 to 0.90, and 0.01 for intersections operating at anything lower.
- Project access to a major road or arterial road would require a driveway that would create an unsafe situation or a new traffic signal or major revisions to an existing traffic signal.
- Project adds traffic to a roadway that has limiting design features or receives use that would be incompatible with substantial increases in traffic, which would become potential safety problems with the addition of project or cumulative traffic. Limiting design features include, but are not limited to narrow width, roadside ditches, sharp curves, poor sight distance, and inadequate pavement structure. Some examples of a roadway receiving incompatible use are large number of heavy truck on rural roads used by farm equipment, livestock, horseback riding, or residential roads with heavy pedestrian or recreational use.

4.8.1. Proposed Action

Increased truck activity from the Proposed Action has the potential to decrease the level of service on traveled roads and affect the integrity of roadway sections. Table 4-5 shows estimated truck trips buildings proposed for demolition and analyzed by Jacobs Engineering in Phase I of their study (Jacobs 20040. “Concrete” truck trips apply to trips required to transport concrete rubble from the demolition site to the location where the concrete would be reused or crushed for engineering fill. “Steel” truck trips apply to trips required to transport structural steel to an approved recycle center for smelting. “Miscellaneous” truck trips refers to trips required to transport C&D debris destined for disposal, and equipment that would be sent to DRMO for resell. “Fill” truck trips refers to trips required to transport fill material from a borrow pit or demolition site on Vandenberg AFB to a destination demolition site. In all cases, truck trips are one-way truck trips.

Of the estimated 4,541 truck trips during Phase I (Jacobs 2004), 259 would be to transport structural steel off-base to a recycling center, while the remaining 4,282 trips would be to transport fill material from a borrow pit or demolition site to a destination demolition site; C&D debris to the Base Landfill; and concrete to the concrete processing area. Assuming the actions occur over a 12-month period with 20 workdays per month, there would be approximately one truck trip per workday transporting steel off base, and 18 truck trips per workday transporting fill, C&D debris, and concrete.

Table 4-4.
LOS significance thresholds.

LOS	Threshold
A	An increase of V/C > 0.20
B	An increase of V/C > 0.15
C	An increase of V/C > 0.10
D	Adding 15 Trips to baseline conditions
E	Adding 10 Trips to baseline conditions
F	Adding 5 Trips to baseline conditions

Table 4-5.
Estimated truck trips for proposed demolition project buildings analyzed during the Jacobs Phase I study (see Appendix A).

Building Number	Description	Estimated Duration (Days)	Project Truck Trips				
			Concrete	Steel	Misc.	Fill	Total
98/99	Oak Mountain Booster Pump/Water Tank	5		0	2		2
470	GERTS Receiver Station	7	6	0	1		7
480	GERTS Receiver Station	7	7	0	1		8
488	GERTS Facility	60	631	13	105	164	914
535	Power Plant 6	60	15	6	37	71	129
733	SLC-4W Fuel Holding Area	160	9	4	13		26
734	SLC-4W Payload HVAC Building		16	2	2		20
736	SLC-4W Oxidizer Holding Area		7	3	10		20
738	SLC-4W MST/UT			146	68	556	769
739	SLC-4W Theodolite Building		8	0	4		12
946	SRM X-Ray Facility	60	581	44	50		675
1200	Santa Ynez Water Plant	90	264	15	56	698	1,034
1201	Pump Station at Santa Ynez Plant		16	1	3		20
1202	Clearwell at Santa Ynez Plant		27	1	37	148	214
1204	Storage Vault at Santa Ynez Plant					40	40
1205	Pump/Generator at Santa Ynez Plant			0	4	3	7
1209	Backwash Reservoir at Santa Ynez Plant		4	0	5	12	21
1505	Re-entry Vehicle Area Water Tower	10		3	1		4
1783	Power Plant 1	60	218	12	54	329	614
20220	Staging Tank at Firefighter Road	10		6			6
Total		***529***	***1,808***	***259***	***453***	***2,021***	***4,541***

Source: Jacobs, 2004.

Given the low ADT volumes and good levels of service currently experienced on the roadways that would be affected by these activities on Vandenberg AFB and its vicinity, and the relatively small increase in daily truck traffic generated by the Proposed Action, no adverse effects to capacity would occur in the study-area roadways. All roadway sections would continue to operate at an LOS in the range of A to B with project-added traffic. Increases in traffic are expected to be short-term on most routes, as demolition sites are widely scattered throughout Vandenberg AFB and the Proposed Action would only involve a small number of demolitions at any one period.

Increased truck activity affects the integrity of roadway sections by increasing the flexures of the pavement. The design life for asphalt pavement, generally selected as either 10 or 20 years, drives engineering specifications for the road based upon the strength of the base soil and the Traffic Index (TI) for the design life. The TI is calculated based upon the number of truck trips that are expected during the design life of the pavement. The theory states that the pavement, during its lifetime, can tolerate a finite number of flexures due to loaded trucks. If the number of truck trips is increased, the life of the pavement is shortened. For example, if a 20-year design were based upon an AADT of 1,000 trucks for 20 years and the volume increases to 2,000 ADT, the structural life of the pavement would be reduced to 10 years.

With the increased truck traffic, the existing pavement sections along truck routes would require more maintenance and may need replacement before the engineered design life is reached. While the current condition of the pavement on all of the affected roads is fair to good, the added truck traffic could cause faster than estimated deterioration of the pavement surface and require additional maintenance. Although an adverse effect, it would not be considered significant given that the number of truck trips per day on roads would not be exceptionally high.

Based upon the range of facilities examined in the Jacobs study (Jacobs 2004), it would be expected that the remainder of the facilities on the proposed demolition list (Appendix A), which have not yet been analyzed, would be comparable to those facilities already studied. Should there be any significantly different findings, additional

environmental analyses would be completed as required if significantly different findings result from future engineering studies completed prior to demolition (see Appendix A for list of buildings not yet analyzed).

Although significant impacts would not occur from the Proposed Action, the following measures would reduce the potential for adverse effects on transportation:

- Encourage project employees to carpool and eat lunch on-site.
- Schedule truck trips during non-peak traffic hours.
- Reduce truck trips by crushing concrete and using as engineered fill on-site instead of shipping the concrete for processing and hauling fill from other locations on Vandenberg AFB.
- Phase demolition activities so concrete can be taken directly from sites not requiring engineered fill to sites that would require engineered fill instead of stockpiling the fill at a central location.
- Phase demolition activities so recyclable materials can be consolidated into full loads of materials ready for shipment to the recycler.
- For sites requiring fill, use borrow pits located on the same section of the base (North Vandenberg AFB vs. South Vandenberg AFB) if feasible, to reduce impacts to off-base roads. The nearest borrow pit with the appropriate fill may be located on the other side of the base and if used, would cause increased traffic on off-base roads.

4.8.2. No-Action Alternative

Under the No-Action Alternative, Atlas and Titan Heritage launch program facilities would not be demolished and 30 CES/CECBR would abandon buildings in-place. If funding is available, maintenance would be performed, but it is anticipated, the levels of maintenance would be lower than current levels. With the buildings abandoned, traffic conditions would improve because workers would not be commuting to work and delivery trucks would not be making deliveries to the building.

4.9. Water Resources

In California, the State Water Resources Control Board (SWRCB) and the RWQCB administer the Clean Water Act (CWA) and state water regulations. The CWA defines the standards for water quality and mandates that treated water discharged to surface water or to the ocean are subject to the requirements of a NPDES General Permit. The RWQCB is responsible for management of the NPDES Permit process for California. The Central Coast RWQCB is the local agency responsible for the Vandenberg AFB area. The NPDES Permit for construction activities ensures that water discharged from a site meets water quality standards at the point of discharge. The NPDES Permit also reduces and eliminates storm water and non-storm water discharges associated with construction activities through BMP controls and site inspections, to evaluate the effectiveness of the permit implementation actions.

The California Porter-Cologne Water Quality Act provides a framework for establishing beneficial uses of water resources and the development of local water quality objectives to protect these beneficial uses. State regulations require a WDR for permitting discharge. A Report of Waste Discharge (RWD) (similar to an NPDES permit application) is required for actions that will involve discharge of waste to surface and/or groundwater. The California Porter-Cologne Water Quality Act implements the NPDES program for the state.

4.9.1. Proposed Action

Adverse impacts to water resources would occur if the Proposed Action 1) caused substantial flooding or erosion; 2) adversely affected surface water quality to the creeks or rivers; or 3) adversely affected groundwater or water quality to localized water resources.

The Proposed Action would require a NPDES Permit as required by Section 402 of the CWA because the total disturbed area of the Proposed Action would be greater than one acre. It is most likely that this multi-facility NPDES Permit would phase in individual facilities as they get awarded on contract and individually terminate facilities as they meet the NDPES Permit termination requirements. The demolition contractor would develop and implement a SWPPP to maintain compliance with the NPDES Permit. All permit conditions and BMPs would be

implemented to minimize the potential for adverse impacts to local water resources. In addition, the demolition contractor would implement all NPDES Permit requirements until the Central Coast CRWQCB officially terminates the individual facility SWPPP or the SWRCB officially terminates the NDPES Permit covering all facilities under the Proposed Action.

A Notice of Intent would be coordinated with the 30 CES/CEV prior to submission to the Central Coast RWQCB. The contractor would submit a Notice of Termination to the Central Coast RWQCB after coordination with 30 CES/CEV to ensure all permit termination requirements are met.

A CWA Section 401 Water Quality Certification from the Central Coast RWQCB and CWA Section 404 Permit from the U.S. Army Corps of Engineers would not be required under the Proposed Action because no direct impacts to water bodies or wetlands would occur. There are no direct discharges from the Proposed Action into any of the CWA Section 303 (d) listed water bodies.

The demolition contractor would implement all permit conditions, contract EPP (which addresses the contractor's site processes for all compliance medias), and Vandenberg AFB Management Plan requirements, and would incorporate these requirements to work practices and procedures to ensure compliance for all project related activities. With the implementation of these procedures and requirements, adverse effects to water resources would be less than significant, as described below.

4.9.1.1. Surface Water and Floodplains

The Proposed Action would entail activities ranging from deconstruction, total above-grade demolition including concrete and steel demolition, to abandonment of facilities with or without demolition activities. These methods of implementing the Proposed Action were considered in the analysis of environmental consequences within the geographical water resources areas described in Chapter 3. Demolition and abandonment activities would occur in three areas: North, North-Central, and South-Central.

Proper management of materials and wastes during the abatement phase for ACM, PCBs, mercury switches, and LBP (as described in Sections 3.4 and 4.4 of this PEA) would reduce or eliminate the potential for contaminated runoff. Deconstruction efforts can result in fewer impacts to surface water than demolition. However, material may need to be temporarily stored while transportation is being arranged for its final disposal. Above-grade demolition could occur with or without prior deconstruction actions. If deconstruction does not occur first, the demolition materials would contain materials that could increase the potential for pollutants such as ACM, PCBs, mercury switches, and LBP. Deconstruction and demolition activities prior to abandonment of a facility may or may not occur. Abandonment actions to ensure facilities are safe and secured against unauthorized human and accidental wildlife intrusions, such as capping utilities, and securing entrance holes, are not anticipated to impact water resources.

The processes of demolition and segregation of materials have the greatest potential for exposing pollutants at a site. Thus, these actions would pose the greatest threat to water resources during the rainy season. There are a variety of BMPs that would be implemented, as required by the NPDES permit, to properly manage materials while on-site, especially during the rainy season. The NPDES Permit would cover all facilities and lay down areas, and include BMP management to control pollutants. Deconstruction and demolition activities would be contained within each facility, and all materials slated for recycle or reuse would be stored for transport within the project boundary established for each site, including the lay down area.

North Area

The topography of the area between Building 1952 and Shuman Creek includes a hill that would serve as a natural barrier between the building and the creek, precluding any runoff from entering the creek (see Figure 3-5). Tributaries to Shuman Creek in this area are approximately 0.5 mile from the buildings. Buildings 1953, and 1958 are surrounded by sand dunes and rolling hills. Implementing BMPs as part of the NPDES Permit to reduce and/or eliminate project-associated runoff would further reduce the potential for adverse effects, especially during the rainy season.

North-Central Area

Potential runoff from activities associated with the Proposed Action at Buildings 1783 and 1795 would not reach San Antonio Creek because

these buildings are situated between 0.1 and 0.27 mile from the creek on a plateau above the creek (see Figure 3-6).

Agricultural lands are present between the abandoned Santa Ynez Water Plant (Buildings 1200, 1201, 1202, 1204, 1205, and 1209) and the Santa Ynez River, which provides a natural system to capture any runoff associated with activities under the Proposed Action from these buildings.

Permanent and/or seasonal wetlands occur throughout the San Antonio Terrace geographical area and near the Santa Ynez River drainage area. However, none of the facilities proposed for demolition or abandonment under the Proposed Action are in the vicinity of these resources.

South-Central Area

The topography of the area would prevent any potential runoff from activities associated with the Proposed Action at Buildings 768 and 535 from reaching Bear Creek, Canada Honda Creek or the Pacific Ocean (see Figure 3-7). The topography of the area (i.e., gentle hills) and sandy soils would prevent potential runoff from these facilities from resulting in adverse effects on these resources. In addition, implementing BMPs as part of the NPDES Permit to reduce and/or eliminate project-associated runoff would further reduce the potential for adverse effects, especially during the rainy season.

4.9.1.2. Groundwater

The Vandenberg AFB water supply primarily comes from water purchased from the California Department of Water Resources State Water Project. Four wells located in the San Antonio Creek-Barka Slough area are used to supplement the Vandenberg AFB state water during annual maintenance periods. The greatest threat to groundwater is contamination from hazardous material or waste releases that could infiltrate an aquifer. The only local ground drinking water sources are the water wells located near Barka Slough, which are approximately 1.2 miles east of Building 20220. In addition, since the Proposed Action is to demolish facilities to grade and to cap and secure utilities at ground level and left abandoned in place, the potential for releases to surface and subsurface waters is drastically reduced. Implementing pollution prevention practices would further reduce the potential for adverse impacts to groundwater resources.

Watering deconstruction and demolition areas for dust control could require up to 5,000 gallons per acre over the course of the Proposed Action. The Vandenberg AFB water supply system capacity is 7.5 million gallons per day. Therefore, watering areas for dust control would not significantly affect the Vandenberg AFB water supply system.

4.9.2. No-Action Alternative

Under the No-Action Alternative, no buildings would be demolished or abandoned as described in Chapter 2 of this PEA. Thus, no impacts would result on water resources.

4.10. Cumulative Impacts

Cumulative impacts result from the incremental effect of an action when added to other past, present, and reasonably foreseeable future actions in the vicinity of the proposed project, regardless of what agency undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

A review of the Vandenberg AFB funding and planning document *Sustainment, Restoration, and Modernization Program*, indicates that current and upcoming projects on Vandenberg AFB would occur throughout the base. Therefore, potential impacts from projects would not be localized to a specific area on Vandenberg AFB. General ongoing operations and maintenance projects include paving, roof repairs, corrosion control, demolitions, and landscaping projects. These projects are scheduled annually and have very limited if any impacts to environmental resources. Projects such as repair of dormitory facilities, renovation of various facilities and launch complexes, and replacement of utilities are common projects that are ongoing on Vandenberg AFB. Future larger projects that are currently projected for the next several years have the greatest potential to result in cumulative impacts. Vandenberg AFB projects contain environmental contract specifications and are individually evaluated for their environmental impacts. Based on the environmental impacts associated with each specific project, environmental protection measures and mitigation requirements are included in the project activities to reduce adverse environmental effects. Thus, individually implemented measures provide cumulative

protection reducing overall adverse effects on Vandenberg AFB environmental resources.

Projects for which an Environmental Assessment has been completed, such as the Western Range Command Transmit Site, Landfill Drainage Improvements, SLC-4 to SLC-6 Replacement Waterline, VTRS Fiber Optic Cable Installation on South Base, 13th Street Bridge Emergency Repairs and Retrofit, and Ground-Based Midcourse Defense Initial Defensive Operations Capability, had findings of no significant impact due to the nature of the actions, the protection measures implemented, and/or mitigation measures developed and implemented to reduce their potential environmental impacts to less than significant.

Upcoming projects identified as having the potential to contribute to cumulative impacts include: Replacement of MFH, a long-term project initiated in 1995 with an estimated completion date of 2008; the expansion of MFH, planned to occur between 2006 and 2008; and the replacement of the 13th Street Bridge over the Santa Ynez River, planned for 2008.

The Proposed Action would be implemented over approximately a 10-year period between 2005 and 2015, and activities would be located throughout Vandenberg AFB. Potential cumulative impacts of the Proposed Action when considered with the past, current and future projects described above, were identified for solid waste. The cumulative solid waste generation of demolition debris and materials from the replacement of MFH and the demolition of buildings under the Proposed Action has the potential to exceed the permitted disposal tonnage. Coordination of implementation schedules for these projects and appropriate tracking of disposal tonnages should ensure that permitted disposal amounts at the Base Landfill are not exceed, thus ensuring adverse effects are below the significance level.

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California Native Plant Society, Los Osos, CA

California Regional Water Quality Control Board, Central Coast Region, San Luis Obispo, CA

Environmental Defense Center, Santa Barbara, CA

La Purisima Audubon Society, Lompoc, CA

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University of California, Museum of Systematics & Ecology, Santa Barbara, CA

Lompoc Public Library, Lompoc, CA

Santa Barbara Public Library, Santa Barbara, CA

Santa Maria Public Library, Santa Maria, CA

University of California, Library, Santa Barbara, CA

Vandenberg AFB Library, Vandenberg AFB, CA

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APPENDIX A

Facilities Proposed for Demolition or Abandonment
by the 30th Space Wing
Civil Engineer Squadron and Plans Office

Appendix A - Facilities Proposed for Demolition or Abandonment (Disposition List)

PROPERTY NUMBER	DESCRIIPTION	LOCATION	AREA	EXECUTION YEAR	JACOBS STUDY	DEMOLITION METHOD	ASBESTOS	PCBs	MERCURY SWITCHES	DIOXIN	LEAD PAINT	DEMOLITION WASTE (TONS)	FILL GENERATED (YD^3)	FILL REQUIRED (YD^3)	REQUIRED IMPORT FILL (YD^3)	CULTURAL RESOURCES	BIOLOGICAL RESOURCES	
98	OAK MTN BOOSTER PUMP STATION	South Base	South-Central	2005	Phase I	Systematic Disassembly	No (Jacobs 2004)	Suspected	Suspected		Suspected	17					Nesting birds	
99	OAK MTN WATER STORAGE TANK	South Base	South-Central	2005	Phase I	Systematic Disassembly	No (Jacobs 2004)	Suspected	Suspected		Suspected							
470	GERTS RECEIVER STATION	South Base	South-Central	2005	Phase I	Systematic Disassembly	No (Jacobs 2004)	No (Jacobs 2004)	No (Jacobs 2004)	No (Jacobs 2004)	Suspected	66	31				Roosting bats	Burton Mesa Chaparral
480	GERTS RECEIVER STATION	South Base	South-Central	2005	Phase I	Systematic Disassembly	No (Jacobs 2004)	No (Jacobs 2004)	No (Jacobs 2004)	No (Jacobs 2004)	Suspected	74	34				Nesting birds	Burton Mesa Chaparral
484	POWER PLANT #3	South Base	South-Central	2005			Yes										Potential nesting/roosting birds/owls/raptors and bats	Burton Mesa Chaparral
488	ELECTRICAL RESEARCH FACILITY	South Base	South-Central	2005	Phase I	Systematic Disassembly	Yes (Jacobs 2004)	Yes (Jacobs 2004)	Suspected	Yes (Jacobs 2004)	Suspected	7,293	3,117	1,644	1,644		Nesting birds; potential roosting bats	Burton Mesa Chaparral
535	POWER PLANT #6	South Base	South-Central	2005	Phase I	Systematic Disassembly	Yes (Jacobs 2004)	Suspected	Suspected		Suspected	508	74	711	637		Nesting/roosting birds and bats	
702	SLC-4 WATER TANK	South Base	South-Central	2006														
713	SLC-4E FUEL TRANSFER PAD	South Base	South-Central	2006	Phase II													
714	SLC-4E FUEL INCINERATOR PAD	South Base	South-Central	2006	Phase II		No											
715	SLC-4E MOBILE SERVICE TOWER	South Base	South-Central	2006	Phase II		Yes										Nesting birds	
	SLC-4E EXHAUST DUCT SUMP						Yes											
	SLC-4 GAS STORAGE																	
	SLC-4E BUCKET																	
	SLC-4E RETENTION BASIN																	
716	SLC-4E FUEL HOLDING AREA	South Base	South-Central	2006	Phase II													
717	SLC-4E PAYLOAD HVAC PLANT	South Base	South-Central	2006	Phase II		No											
719	SLC-4E CLEAN ROOM HVAC PLANT	South Base	South-Central	2006	Phase II													
722	SLC-4E OXIDIZER HOLD AREA	South Base	South-Central	2006	Phase II													
725	SLC-4 TSB-2 FACILITY	South Base	South-Central	2006			No	No										
726	OXIDIZER SCRUBBER PAD	South Base	South-Central	2006	Phase II													
729	SLC-4 UPS BLDG	South Base	South-Central	2006	Phase II													
733	SLC-4W FUEL HOLDING AREA	South Base	South-Central	2005	Phase I	Systematic Disassembly	Yes (Jacobs 2004)	Suspected	Suspected		Suspected	240	194				Potential nesting birds	
734	SLC-4W PAYLOAD HVAC BLDG	South Base	South-Central	2005	Phase I	Systematic Disassembly	Yes (Bio Study)				Suspected	196					Potential nesting birds	
736	SLC-4W OXIDIZER HOLDING AREA	South Base	South-Central	2005	Phase I	Systematic Disassembly	Yes (Jacobs 2004)	Suspected	Suspected		Suspected	176					Potential nesting birds	
737	SLC-4W PAD SUPPORT BUILDING	South Base	South-Central	2006	Phase II		Yes											
738	SLC-4W MOBILE SERVICE TOWER	South Base	South-Central	2005	Phase I	Explosives & Systematic Disassembly	Yes (Jacobs 2004)	Suspected	Suspected		Present	1,979			2,778		Nesting birds	
	SLC-4W UMBILICAL TOWER					Cutting & Systematic Disassembly	Yes (Jacobs 2004)										Nesting birds	
	SLC-4W LAUNCH SUPPORT BUILDING			2006	Phase II		Yes (Jacobs 2004)											
	SLC-4W BUCKET					Infill											Nesting birds	
	SLC-4W RETENTION BASIN													450	256		Nesting birds	
739	SLC-4W THEODOLITE BLDG	South Base	South-Central	2005	Phase I	Systematic Disassembly	Suspected	Suspected	Suspected		Suspected	108						
746	SLC-4 ENTRY CONTROL POINT	South Base	South-Central	2006	Phase II													
768	SLC-3W ENTRY CONTROL POINT	South Base	South-Central				Yes										Potential nesting birds	
946	SRM X-RAY FACILITY	South Base	South-Central	2005	Phase I	Systematic Disassembly	No (Jacobs 2004)	No (Jacobs 2004)	No (Jacobs 2004)		Suspected	6,652	2,867				Nesting/roosting birds/owls/raptors	

PROPERTY NUMBER	DESCRIIPTION	LOCATION	AREA	EXECUTION YEAR	JACOBS STUDY	DEMOLITION METHOD	ASBESTOS	PCBs	MERCURY SWITCHES	DIOXIN	LEAD PAINT	DEMOLITION WASTE (TONS)	FILL GENERATED (YD^3)	FILL REQUIRED (YD^3)	REQUIRED IMPORT FILL (YD^3)	CULTURAL RESOURCES	BIOLOGICAL RESOURCES	
1200	SANTA YNEZ WATER PLANT	North Base	North-Central	2005	Phase I	Systematic Disassembly	Suspected	Suspected	Suspected		Suspected	3,607					Nesting birds and roosting bats	Potential for special status plant species
1201	SANTA YNEZ BOOSTER PUMP STATION	North Base	North-Central	2005	Phase I	Systematic Disassembly	Yes (Jacobs 2004)	Suspected	Suspected		Suspected	206						Potential for special status plant species
1202	SANTA YNEZ PLANT CLEARWELL	North Base	North-Central	2005	Phase I	Systematic Disassembly	Yes (Jacobs 2004)	Suspected	Suspected		Suspected	584					Nesting birds and potential roosting bats	Potential for special status plant species
1204	SANTA YNEZ PLANT WATER STORAGE VAULT	North Base	North-Central	2005	Phase I	Systematic Disassembly	Yes (Jacobs 2004)	Suspected	Suspected		Suspected		1,536	5,518	3,982		Potential roosting bats	Potential for special status plant species
1205	SANTA YNEZ PLANT PUMP/GENERATOR FACILITY	North Base	North-Central	2005	Phase I	Systematic Disassembly	Yes (Jacobs 2004)	Suspected	Suspected		Suspected	38						Potential for special status plant species
1209	SANTA YNEZ PLANT BACKWASH RESERVOIR	North Base	North-Central	2005	Phase I	Systematic Disassembly	Yes (Jacobs 2004)	Suspected	Suspected		Suspected	82						Potential for special status plant species
1505	RE-ENTRY VEHICLE AREA WATER TOWER	North Base	North-Central	2005	Phase I	Systematic Disassembly					Suspected	38						Burton Mesa Chaparral
1537	576FLTS MUNITIONS STORAGE	North Base	North-Central	2005	Phase II		No										Nesting/roosting birds/owls and roosting bats	
1538	576FLTS MUNITIONS STORAGE	North Base	North-Central	2005	Phase II		No											
1539	576FLTS MUNITIONS STORAGE	North Base	North-Central	2005	Phase II		No											
1783	POWER PLANT #1	North Base	North-Central	2005	Phase I	Systematic Disassembly	Yes (Jacobs 2004)	Suspected	Suspected		Suspected	2,744	1,079	3,288	2,209		Nesting/roosting birds/owls/raptors	
1795	ABRES STORAGE	North Base	North-Central															
1823	ABRES B LCC	North Base	North-Central				Yes										Nesting/roosting birds/owls/raptors and bats	
1825	ABRES B PAD B-2	North Base	North-Central				Yes										Nesting/roosting birds/owls/raptors and bats	
1830	ABRES B PUMP HOUSE	North Base	North-Central				Suspected										Roosting bats	
1835	ABRES B PAD B-1	North Base	North-Central				Yes										Nesting/roosting birds/owls/raptors and bats	
1836	576FLTS PK STAGE STORAGE FACILITY	North Base	North-Central				Yes										Nesting/roosting birds/owls/raptors and bats	
1853	GROUND GUIDANCE	North Base	North				Yes										Roosting bats	
1874	ANTENNA TERMINAL ROOM	North Base	North				Yes											
1895	OLD ATLAS LAUNCH PAD (576-C)	North Base	North				Yes										Nesting/roosting owls/raptors and bats	
1952	RF Hut 1	North Base	North															
1953	RF Hut 2	North Base	North															
1957	RF Hut 8	North Base	North															
1958	RF Hut 7	North Base	North															
1982	RF Hut 3	North Base	North															
1992	RF Hut 9	North Base	North															
1995	RF Hut 5	North Base	North															
20220	STAGING TANK AT FIREFIGHTER RD RESERVOIR	North Base	North-Central	2005	Phase I	Systematic Disassembly					Suspected	60						

APPENDIX B

Biological Resources

Appendix B – Biological Resources

Summary of biological surveys completed at facilities proposed for demolition or abandonment.

BLDG	DESCRIPTION	FAUNA	FLORA	RECOMMENDATION
98	Oak Mountain Booster Pump Station	Black phoebe nest on exterior. No evidence of nesting in interior although two broken windows are present that could admit birds.	Disturbed Central Coastal Scrub dominated by *Baccharis pilularis* and *Artemisia californica*. *Carpobrotus edulis* and various grasses dominate the herbaceous layer.	Demolition outside of avian nesting season (March - July) or exclusion of potential breeders at least one month prior to nesting season (February).
99	Oak Mountain Water Storage Tank	No evidence of past nesting.	Disturbed Central Coastal Scrub dominated by *Baccharis pilularis* and *Artemisia californica. Carpobrotus edulis* and various grasses dominate the herbaceous layer.	
470	GERTS Receiver Station	*Eptesicus fuscus, Myotis californicus* - Night Roost (Pierson 2002).	Surrounding vegetation is composed of Burton Mesa Chaparral dominated by *Arctostaphylos purissima*.	Bat surveys and exclusion if necessary at least three months prior to demolition.
480	GERTS Receiver Station	Lacking door leaves interior accessible to birds and bats. Passerine nests are present above fluorescent fixtures. Evidence that mud nests once existed on one of the interior walls. Barn swallow nesting documented in past (USAF 1998c).	Vegetation immediately surrounding the building is Non-native Grassland comprised largely of *Medicago polymorpha*, *Bromus* spp., *Vulpia myuros*, and *Cortaderia jubata* with scattered *Baccharis pilularis*.	Demolition outside of passerine avian nesting season (March - July) or exclusion of potential breeders at least one month prior to nesting season (February). Survey for owls/raptors prior to start of breeding season (mid-January), and exclusion if necessary at that time. Bat surveys and exclusion if necessary at least three months prior to demolition.
484	Power Plant /33	Numerous openings, the largest of which are over 6 inches in diameter, provide access to the interior for birds and bats.	Buildings are situated on pavement. Surrounding vegetation is composed of Burton Mesa Chaparral dominated by *Arctostaphylos purissima*.	Demolition outside of avian nesting season (March - July) or exclusion of potential breeders at least one month prior to nesting season (February). Survey for owls/raptors prior to start of breeding season (mid-January), and exclusion if necessary at that time. Bat surveys and exclusion if necessary at least three months prior to demolition. Delineation of work area to minimize potential disturbance to Burton Mesa Chaparral.
488	Electrical Research Facility	Evidence of nesting birds. Potential for bats to roost.	Buildings are situated on pavement. Surrounding vegetation is composed of Burton Mesa Chaparral dominated by *Arctostaphylos purissima*.	Demolition outside of avian nesting season (March - July) or exclusion of potential breeders at least one month prior to nesting season (February). Bat surveys and exclusion if necessary at least three months prior to demolition. Delineation of work area to minimize potential disturbance to Burton Mesa Chaparral.

BLDG	DESCRIPTION	FAUNA	FLORA	RECOMMENDATION
535	Power Plant #6	Exterior nests. Evidence of roosting inside building. *Myotis* sp. (Pierson 2002).		Demolition outside of avian nesting season (March - July) or exclusion of potential breeders at least one month prior to nesting season (February). Bat surveys and exclusion if necessary at least three months prior to demolition.
702	SLC-4 Water Tank	No evidence of past nesting, but unable to see top of tank.	Vegetation within the perimeter fence is largely Non-native Grassland comprised of *Ehrharta calycina*, *Cortaderia jubata*, *Plantago coronopus*, and *Pteridium esculentum.* Outside the fence is an intact Central Coastal Scrub community dominated by *Toxicodendron diversilobum*, *Baccharis pilularis*, *Artemisia californica*, and *Salvia mellifera*. Scattered *Pinus radiata* are also present.	
713	SLC-4E Fuel Transfer Pad	No evidence of past nesting. Structure does not appear to provide opportunities for nesting,	Structures are largely situated on concrete or asphalt. The nearest vegetation is mowed and consists largely of weedy Non-native Grassland species such as *Carpobrotus edulis*, *Ehrharta calycina*, *Bromus* spp., *Avena barbata*, and *Lotus scoparius*.	
714	SLC-4E Fuel Incinerator Pad	No evidence of past nesting. Structure does not appear to provide opportunities for nesting.	Structures are largely situated on concrete or asphalt. The nearest vegetation is mowed and consists largely of weedy Non-native Grassland species such as *Carpobrotus edulis*, *Ehrharta calycina*, *Bromus* spp., *Avena barbata*, and *Lotus scoparius*.	
715	SLC-4E Mobile Service Tower	White-throated swifts, house finches, barn swallow and European starlings appear to be nesting in the structure.	Structures are largely situated on concrete or asphalt. The nearest vegetation is mowed and consists largely of weedy Non-native Grassland species such as *Carpobrotus edulis*, *Ehrharta calycina*, *Bromus* spp., *Avena barbata*, and *Lotus scoparius*.	Demolition outside of avian nesting season (March - July) or exclusion of potential breeders at least one month prior to nesting season (February).
	SLC-4E Exhaust Duct Sump	No evidence of past nesting. Floor accumulates water, which can get several feet deep. Water was less than a foot in depth at the time of the survey.		
	SLC-4 Gas Storage	No evidence of past nesting; limited opportunities.		
	SLC-4E Bucket	No evidence of past nesting; limited opportunities.		
	SLC-4E Retention Basin	No evidence of past nesting; limited opportunities.		
716	SLC-4E Fuel Holding Area	Lots of house finch activity; could be preparing to nest in rafters.	Structures are largely situated on concrete or asphalt. The nearest vegetation is mowed and consists largely of weedy Non-native Grassland species such as *Carpobrotus edulis*, *Ehrharta calycina*, *Bromus* spp., *Avena barbata*, and *Lotus scoparius*.	Demolition outside of avian nesting season (March - July) or exclusion of potential breeders at least one month prior to nesting season (February).

BLDG	DESCRIPTION	FAUNA	FLORA	RECOMMENDATION
717	SLC-4E Payload HVAC Plant	House finch and black phoebe nests present in the vent ducts.	Structures are largely situated on concrete or asphalt. The nearest vegetation is mowed and consists largely of weedy Non-native Grassland species such as *Carpobrotus edulis*, *Ehrharta calycina*, *Bromus* spp., *Avena barbata*, and *Lotus scoparius*.	Demolition outside of avian nesting season (March - July) or exclusion of potential breeders at least one month prior to nesting season (February).
719	SLC-4E Clean Room HVAC Plant	No evidence of past nesting; structure does not appear to provide opportunities for nesting.	Structures are largely situated on concrete or asphalt. The nearest vegetation is mowed and consists largely of weedy Non-native Grassland species such as *Carpobrotus edulis*, *Ehrharta calycina*, *Bromus* spp., *Avena barbata*, and *Lotus scoparius*.	
722	SLC-4E Oxidizer Hold Area	Lots of house finch activity; could be preparing to nest in rafters.	Structures are largely situated on concrete or asphalt. The nearest vegetation is mowed and consists largely of weedy Non-native Grassland species such as *Carpobrotus edulis*, *Ehrharta calycina*, *Bromus* spp., *Avena barbata*, and *Lotus scoparius*.	Demolition outside of avian nesting season (March - July) or exclusion of potential breeders at least one month prior to nesting season (February).
725	SLC-4 TSB-2 Facility	No evidence of past nesting; structure does not appear to provide opportunities for nesting.	Structures are largely situated on concrete or asphalt. The nearest vegetation is mowed and consists largely of weedy Non-native Grassland species such as *Carpobrotus edulis*, *Ehrharta calycina*, *Bromus* spp., *Avena barbata*, and *Lotus scoparius*.	
726	Oxidizer Scrubber Pad	No evidence of past nesting; structure does not appear to provide opportunities for nesting.	Structures are largely situated on concrete or asphalt. The nearest vegetation is mowed and consists largely of weedy Non-native Grassland species such as *Carpobrotus edulis*, *Ehrharta calycina*, *Bromus* spp., *Avena barbata*, and *Lotus scoparius*.	
729	SLC-4 UPS Bldg	No evidence of past nesting; structure does not appear to provide opportunities for nesting.	Structures are largely situated on concrete or asphalt. The nearest vegetation is mowed and consists largely of weedy Non-native Grassland species such as *Carpobrotus edulis*, *Ehrharta calycina*, *Bromus* spp., *Avena barbata*, and *Lotus scoparius*.	
733	SLC-4W Fuel Holding Area	Lots of house finch activity; could be preparing to nest in rafters.	Structures are largely situated on concrete or asphalt. The nearest vegetation is mowed and consists largely of weedy Non-native Grassland species such as *Carpobrotus edulis*, *Ehrharta calycina*, *Bromus* spp., *Avena barbata*, and *Lotus scoparius*.	Demolition outside of avian nesting season (March - July) or exclusion of potential breeders at least one month prior to nesting season (February).
734	SLC-4W Payload HVAC Bldg	No evidence of past nesting; but vent ducts could be used for nesting.	Structures are largely situated on concrete or asphalt. The nearest vegetation is mowed and consists largely of weedy Non-native Grassland species such as *Carpobrotus edulis*, *Ehrharta calycina*, *Bromus* spp., *Avena barbata*, and *Lotus scoparius*.	

BLDG	DESCRIPTION	FAUNA	FLORA	RECOMMENDATION
736	SLC-4W Oxidizer Holding Area	Lots of house finch activity; could be preparing to nest in rafters.	Structures are largely situated on concrete or asphalt. The nearest vegetation is mowed and consists largely of weedy Non-native Grassland species such as *Carpobrotus edulis*, *Ehrharta calycina*, *Bromus* spp., *Avena barbata*, and *Lotus scoparius*.	Demolition outside of avian nesting season (March - July) or exclusion of potential breeders at least one month prior to nesting season (February).
737	SLC-4W Pad Support Bldg	Evidence of birds roosting in smoking shack adjacent to building. No evidence of past nesting.	Structures are largely situated on concrete or asphalt. The nearest vegetation is mowed and consists largely of weedy Non-native Grassland species such as *Carpobrotus edulis*, *Ehrharta calycina*, *Bromus* spp., *Avena barbata*, and *Lotus scoparius*.	
738	SLC-4W Mobile Service Tower	White-throated swifts, house finches, barn swallow and European starlings appear to be nesting in the structure.	Structures are largely situated on concrete or asphalt. The nearest vegetation is mowed and consists largely of weedy Non-native Grassland species such as *Carpobrotus edulis*, *Ehrharta calycina*, *Bromus* spp., *Avena barbata*, and *Lotus scoparius*.	Demolition outside of avian nesting season (March - July) or exclusion of potential breeders at least one month prior to nesting season (February).
	SLC-4W Umbilical Tower	White-throated swifts, house finches, barn swallow and European starlings appear to be nesting in the structure.		Demolition outside of avian nesting season (March - July) or exclusion of potential breeders at least one month prior to nesting season (February).
	SLC-4W Bucket	No evidence of past nesting, limited opportunities.		
	SLC-4W Retention Basin	No evidence of past nesting, limited opportunities.		
739	SLC-4W Theodolite Bldg	No evidence of past nesting; structure does not appear to provide opportunities for nesting.	Structures are largely situated on concrete or asphalt. The nearest vegetation is mowed and consists largely of weedy Non-native Grassland species such as *Carpobrotus edulis*, *Ehrharta calycina*, *Bromus* spp., *Avena barbata*, and *Lotus scoparius*.	
746	SLC-4 Entry Control Point	appear to provide opportunities for nesting.	species such as *Carpobrotus edulis*, *Ehrharta calycina*, *Bromus* spp., *Avena barbata*, and *Lotus scoparius*.	
768	SLC-3W Entry Control Point	No evidence of past nesting; interior inaccessible and still in use by people. Holes on the underside of the lip of the roof could admit birds. One of the personnel at the facility said that birds had attempted to nest in these openings in the past.	Building on asphalt surface	
946	SRM X-Ray Facility	Black phoebe nest in interior; raptor nest on catwalk at south side of building. Great-horned owl roosting near raptor nest.	Structure on asphalt. Weedy vegetation dominated by annuals *(Erodium* spp., *Bromus* spp.) borders the pavement grading into Central Coastal Scrub dominated by *Artemisia californica*, *Baccharis pilularis* and *Ericameria ericoides*.	Demolition outside of avian nesting season (March - July) or exclusion of potential breeders at least one month prior to nesting season (February). Survey for owls/raptors prior to start of breeding season (mid-January), and exclusion if necessary at that time. Bat surveys and exclusion if necessary at least three months prior to demolition.

BLDG	DESCRIPTION	FAUNA	FLORA	RECOMMENDATION
1200	Santa Ynez Water Plant	Numerous cliff swallow nests on exterior. Broken windows, gaps in boarded windows can admit birds and bats. *Myotis californicus* - Day Roost (Pierson 2002).	Site bordered by a tree line composed mainly of *Pinus radiata* with scattered *Eucalyptus* spp. Vegetation adjacent to structures is largely Non-native Grassland dominated by *Hordeum murinum*, *Medicago polymorpha*, and *Erodium* spp. Gaviota tarplant *(Deinandra increscens* spp. *villosa*) present on the eastern side of the site, not near any buildings that would be demolished.	Demolition outside of avian nesting season (March - July) or exclusion of potential breeders at least one month prior to nesting season (February). Bat surveys and exclusion if necessary at least three months prior to demolition.
1201	Santa Ynez Booster Pump Station	No evidence of past nesting.		
1202	Santa Ynez Plant Clearwell	Black phoebe nest on exterior; broken windows allow access to interior.		Demolition outside of avian nesting season (March - July) or exclusion of potential breeders at least one month prior to nesting season (February). Bat surveys and exclusion if necessary at least three months prior to demolition.
1204	Santa Ynez Plant Storage Vault	Small open shack with no evidence of past nesting. Open door provides access to interior.		Bat surveys and exclusion if necessary at least three months prior to demolition.
1205	Santa Ynez Plant Pump/ Generator Facility	No evidence of past nesting.		
1209	Santa Ynez Plant Backwash Reservoir	No evidence of past nesting.		
1505	Re-entry Vehicle Area Water Tower	No evidence of past nesting.	Open area immediately bellow tower dominated by herbaceous annuals *(Erodium cicutarium*, and *Plantago coronopus*). Surrounded by Burton Mesa Chaparral dominated by *Ceanothus impressus, C. cuneatus*, *Salvia mellifera*, and *Arctostaphylos purissima*.	Delineation of work area to minimize potential disturbance to Burton Mesa Chaparral.
1537	576FLTS Munitions Storage	Building is open. *Myotis* sp. (Pierson 2002). Cliff swallows and barn swallows were observed inside, will likely set up nests. Evidence of barn owl roosting in interior.	Vegetation consists of mowed non-native Grassland dominated by *Ehrharta calycina*, *Bromus* spp., *Hordeum murinum*, *Medicago polymorpha* and *Carpobrotus edulis*.	Demolition outside of avian nesting season (March - July) or exclusion of potential breeders at least one month prior to nesting season (February). Survey for owls/raptors prior to start of breeding season (mid-January), and exclusion if necessary at that time. Bat surveys and exclusion if necessary at least three months prior to demolition.
1538	576FLTS Munitions Storage	Interior secure except for some small openings in east end. No sign of birds or bats.	Vegetation consists of mowed non-native Grassland dominated by *Ehrharta calycina*, *Bromus* spp., *Hordeum murinum*, *Medicago polymorpha* and *Carpobrotus edulis*.	
1539	576FLTS Munitions Storage	Interior secure. Evidence of nesting in bay door, likely European starlings. No signs of birds or bats in interior.	Vegetation consists of mowed non-native Grassland dominated by *Ehrharta calycina*, *Bromus* spp., *Hordeum murinum*, *Medicago polymorpha* and *Carpobrotus edulis*.	

BLDG	DESCRIPTION	FAUNA	FLORA	RECOMMENDATION
1783	Power Plant #1	Cliff swallow nests on exterior. Hole in the wall of the northwest corner of the building. White wash and owl pellets below hole; hole large enough to admit barn owl.	*Salix lasiolepis* is growing by the northwest corner. *Carpobrotus edulis*, *Cortaderia jubata*, *Baccharis pilularis*, *Avena barbata* and *Bromus hordeaceus* dominate adjacent Non-native Grassland/disturbed Central Coastal Scrub.	Demolition outside of avian nesting season (March - July) or exclusion of potential breeders at least one month prior to nesting season (February). Survey for owls/raptors prior to start of breeding season (mid-January), and exclusion if necessary at that time.
1795	ABRES STORAGE	Not accessible at time of surveys	Not accessible at time of surveys.	Biological survey at least two months prior to demolition.
1823	ABRES B LCC	Partially subterranean structure. House finches appear to be nesting in the hanging. *Carpobrotus edulis* and shrubs surrounding the entryway. Sizable accumulations of barn owl pellets were found throughout the structure. Light to moderate guano accumulations in interior rooms. Some guano appears fresh, no bats were observed.	Vegetation is primarily composed of Non-native Grassland species dominated by *Ehrharta calycina*, *Carpobrotus edulis*, with some *Baccharis pilularis*, and *Ericameria ericoides* growing by the entry way.	Demolition outside of avian nesting season (March - July) or exclusion of potential breeders at least one month prior to nesting season (February). Survey for owls/raptors prior to start of breeding season (mid-January), and exclusion if necessary at that time. Bat surveys and exclusion if necessary at least three months prior to demolition.
1825	ABRES B Pad B-2	Evidence of extensive usage of the building by barn owls. Barn swallows are constructing nests on the exterior. Moderate guano accumulations are present in the dark interior rooms; guano does not appear to have been deposited recently. *Eptesicus fuscus* - Day Roost (Pierson 2002).	Most of the vegetation immediately surrounding the building is regularly mowed and composed of Non-native Grassland species including *Ehrharta calycina*, *Medicago polymorpha*, *Bromus* spp., *Erodium* spp., *Carpobrotus edulis* and scattered *Eriogonum parvifolium*, and *Ericameria ericoides*.	Demolition outside of avian nesting season (March - July) or exclusion of potential breeders at least one month prior to nesting season (February). Survey for owls/raptors prior to start of breeding season (mid-January), and exclusion if necessary at that time. Bat surveys and exclusion if necessary at least three months prior to demolition.
1830	ABRES B Pump House	*Myotis californicus* - Night Roost (Pierson 2002).		Bat surveys and exclusion if necessary at least three months prior to demolition.
1835	ABRES B Pad B-1	Evidence of past nesting by passerines (likely European starlings) in gaps above sliding door. Accumulation of owl pellets in garage on the east side of the building. Upper shelf not visible but is a potential nesting location. Large room accessible from open rear door and bears evidence of infrequent use by owls. There is a partially enclosed room at the rear of the building with a large accumulation of owl pellets and heavily whitewashed walls. Owls are likely nesting on the overhead piping. *Eptesicus fuscus* - Day Roost (Pierson 2002).	Non-native Grassland predominates; dominant species are *Brassica nigra*, *Sonchus oleraceus*, *Carpobrotus edulis*, *Bromus diandrus*, *Medicago polymorpha* and *Hordeum murinum*.	Demolition outside of avian nesting season (March - July) or exclusion of potential breeders at least one month prior to nesting season (February). Survey for owls/raptors prior to start of breeding season (mid-January), and exclusion if necessary at that time. Bat surveys and exclusion if necessary at least three months prior to demolition.

BLDG	DESCRIPTION	FAUNA	FLORA	RECOMMENDATION
1836	576 FLTS PK Stage Storage Facility	Black phoebes are nesting in outer rooms. There are sizable pellet and feather accumulations indicating extensive use by barn owls. House finches were observed utilizing an old phoebe nest in the adjacent guard shack. Guano accumulations light to moderate. The most sizable guano accumulation was located in the metal tube connecting 1836 to the adjacent structure. *Myotis* sp. - Night Roost (Pierson 2002).	Vegetation is primarily composed of Non-native Grassland species that are regularly mowed. These species include *Vicia sativa*, *Bromus* spp., *Ehrharta calycina*, *Carpobrotus edulis*, *Medicago polymorpha*, and *Erodium* spp.	Demolition outside of avian nesting season (March - July) or exclusion of potential breeders at least one month prior to nesting season (February). Survey for owls/raptors prior to start of breeding season (mid-January), and exclusion if necessary at that time. Bat surveys and exclusion if necessary at least three months prior to demolition.
1853	Ground Guidance	No evidence of past nesting. Interior is not accessible to birds or bats at the present time. *Corynorhinus townsendii* - Day Roost (Pierson 2002).	Low growing exotic trees near entrance. Surrounding vegetation composed of scattered *Baccharis pilularis*, *Carpobrotus edulis*, *Medicago polymorpha*, *Vicia sativa*, and *Erodium* spp.	Bat surveys and exclusion if necessary at least three months prior to demolition.
1874	Antenna Terminal Room	No evidence of past nesting on structures. Western meadowlarks could be nesting in intervening grassy areas.		Demolition outside of avian nesting season (March - July) or survey intervening grass areas prior to demolition for presence of Western meadowlark nests.
1895	Old Atlas Launch Pad (576-C)	Two open garages, through which a third room is accessible. The north most garage has sizable pellet and whitewash accumulations; there are also large accumulations of pellets in the third room. Metal tube connecting to adjacent building had two roosting big brown bats and moderate guano accumulation. *Myotis californicus, Eptesicus fuscus, Tadarida brasiliensis, Myotis yumanensis, Myotis* sp. - Day Roost/Night Roost (Pierson 2002).	Non-native Grassland comprised of *Vulpia myuros*, *Bromus madritensis*, *Medicago polymorpha*, *Bromus diandrus*, with a few *Artemisia californica*, *Baccharis pilularis*, and *Salix lasiolepis* growing adjacent to the buildings.	Survey for owls/raptors prior to start of breeding season (mid-January), and exclusion if necessary at that time. Bat surveys and exclusion if necessary at least three months prior to demolition.
1952	RF Hut 1	Extensive cliff swallow nesting on exterior.	Surrounding vegetation mowed dominated by *Lolium multiflorum*, *Plantago coronopus*, and *Bromus diandrus.*	Demolition outside of avian nesting season (March - July) or exclusion of potential breeders at least one month prior to nesting season (February).
1953	RF Hut 2	No evidence of nesting on exterior. Holes near roof provide access to interior.	Surrounding vegetation mowed dominated by *Lolium multiflorum*, *Hordeum murinum, Phalaris aquatica, Brassica nigra*, and *Plantago coronopus*.	Survey for birds in interior prior to start of nesting (February), and exclusion if necessary at that time.
1957	RF Hut 8	No evidence of nesting on exterior. Holes near roof provide access to interior.	Surrounding vegetation mowed dominated by *Lolium multiflorum*, *Melotis indicus*, *Plantago coronopus*, and *Sonchus oleraceus*.	Survey for birds in interior prior to start of nesting (February), and exclusion if necessary at that time.
1958	RF Hut 7	No evidence of nesting on exterior. Holes near roof provide access to interior.	Surrounding vegetation mowed dominated by *Lolium multiflorum*, *Raphanus sativus, Plantago coronopus,* and *Sonchus oleraceus*.	Survey for birds in interior prior to start of nesting (February), and exclusion if necessary at that time.
1982	RF Hut 3	Two cliff swallow nests on exterior. Holes near roof provide access to interior.	Surrounding vegetation mowed dominated by *Melotis indica, Brassica nigra, Plantago coronopus, Asphodelus fistulosus*, and *Sonchus oleraceus*.	Demolition outside of avian nesting season (March - July) or exclusion of potential breeders at least one month prior to nesting season (February).

BLDG	DESCRIPTION	FAUNA	FLORA	RECOMMENDATION
1992	RF Hut 9	No evidence of nesting on exterior. Holes near roof provide access to interior.	Surrounding vegetation mowed dominated by *Foeniculum vulgare, Brassica nigra, Plantago coronopus, Avena barbata*, and *Melotis indicus*.	Survey for birds in interior prior to start of nesting (February), and exclusion if necessary at that time.
1995	RF Hut 5	No evidence of nesting on exterior. Interior not accessible.	Surrounding vegetation mowed dominated by *Lolium multiflorum, Phalaris aquatica, Melotis indicus*, and *Plantago coronopus*.	
20220	Staging Tank at Firefighter Road	Not accessible at time of surveys.	Not accessible at time of surveys.	Biological surveys at least two months prior to scheduled demolition.

APPENDIX C

Cultural Resources

Appendix C – Cultural Resources

The following synthesis, modified from Lebow and Moratto (2001), provides a general overview of the prehistory and ethnohistory of the Vandenberg AFB region (i.e., Santa Barbara and San Luis Obispo counties). The historical synthesis, primarily derived from Palmer (1999), is more specific to Vandenberg AFB.

Prehistory

The prehistory of California's central coast spans the entire Holocene and may extend back to late Pleistocene times. In the Santa Barbara Channel region, a fluted Clovis point found on the surface of a coastal site suggests use of the area possibly as early as 11,000–12,000 years ago (Erlandson et al. 1987), while a site on San Miguel Island has yielded a radiocarbon date of 10,300 B.P. (Erlandson 1991). Recent calibrations suggest that terminal Pleistocene radiocarbon dates are about 2,000 years too recent (Fiedel 1999:95) and thus these early sites may be even older.

In San Luis Obispo County, excavations at CA-SLO-2 in Diablo Canyon revealed an occupation older than 9,000 years (Greenwood 1972; Moratto 1984) and investigations at CA-SLO-1797 indicate initial occupations as early as 10,300 B.P. (Fitzgerald 2000). Occupations on Vandenberg AFB occurred by at least 8,500–9,000 years ago, based on radiocarbon dates from CA-SBA-246 (Lebow et al. 2001) and CA-SBA-931 (Glassow 1990, 1996) both located near the mouth of the Santa Ynez River.

Moratto (1984) refers to these early occupations as Paleocoastal. Population densities were probably low, judging from the limited number of sites dated to this period. Diagnostic tools associated with this time period have not been identified, although similarities with the San Dieguito Complex in southern California (Wallace 1978; Warren 1967) have been suggested (Erlandson 1994). Cultural assemblages have few of the grinding implements common to subsequent periods. These sites are characterized by a strong maritime orientation and an apparent reliance on shellfish. Occupants are thought to have lived in small groups that had a relatively egalitarian social organization and a forager-type land-use strategy (Erlandson 1994; Glassow 1996; Greenwood 1972; Moratto 1984).

Site densities throughout the Central Coast are higher during the subsequent periods, suggesting increased population size and possibly better site preservation. Sites dating between about 8,000 and 6,500 years ago often have relatively high densities of manos and milling slabs that are typically associated with processing seeds. These milling stones are diagnostic of this period. Early scholars associated sites of this age with inland knolls and terraces (e.g., Rogers 1929), but subsequent investigations revealed that coastal environments were also used (e.g., Glassow et al. 1988). Well-developed middens at many sites suggest a more sedentary and stable settlement system (Breschini et al. 1983). Glassow (1990, 1996) infers that occupants of Vandenberg AFB during this time were sedentary and had begun using a collector-type (i.e., logistically mobile) land-use strategy. Burial practices suggest that society was primarily egalitarian (Glassow 1996).

Diet appears to have been diverse during the period between 8000 and 6500 B.P. High frequencies of milling stones suggest that seeds were important (Glassow 1996; Glassow et al. 1988), although shellfish appear to have continued as a dietary staple throughout the Central Coast (Erlandson 1994; Glassow et al. 1988), including Vandenberg AFB (Glassow 1996; Woodman, Cagle, de Barros et al. 1995). However, terrestrial mammals composed a larger portion of the diet on Vandenberg AFB during this period than during any other time (Glassow 1996; Rudolph 1991). Fish were a larger part of the diet than shellfish at Morro Bay in San Luis Obispo County, although shellfish were better represented during this period than during subsequent periods (Jones et al. 1994).

Population densities appear to have decreased substantially between 6500 and 5000 B.P. throughout the region, and little is known about this period. It is possible that arid conditions associated with the Altithermal

degraded the environment to the point that only low population densities were possible (Glassow 1996; Glassow et al. 1988).

After 5000 B.P., population densities increased to pre-6500 B.P. levels as conditions became cooler and more moist. Between 5000 and 3000 B.P., mortars and pestles became increasingly common throughout the region, suggesting intensified use of acorns (Basgall 1987; Glassow et al. 1988), although these implements may have been associated with processing pulpy roots or tubers (Glassow 1997). Along the Santa Barbara Channel coastline, use of shellfish declined as other animal foods became more important. Use of more diverse environmental settings is suggested (Erlandson 1997). On Vandenberg AFB, fish and sea mammals composed a larger part of the diet during this period. Large side-notched and stemmed projectile points became more prevalent in the archaeological record, presumably reflecting increased hunting, although Glassow (1996) suggests that proportions of terrestrial mammals do not surpass the pre-6500 B.P. levels. However, higher proportions of terrestrial mammals in archaeological assemblages are associated with this period in San Luis Obispo County. Increased logistical organization is suggested in this area (Jones et al. 1994; Jones and Waugh 1995). Proportions of obsidian (indicating exchange with other regions) increased after about 5000 B.P., particularly in San Luis Obispo County (Jones et al. 1993, 1994; Jones and Waugh 1995).

Cultural complexity appears to have increased around 3,000–2,500 B.P. Based on mortuary data from the Santa Barbara area, C. King (1981, 1990) suggests a substantial change in social organization and political complexity about 3,000 years ago. According to King, high-status positions became hereditary and individuals began to accumulate wealth and control exchange systems. Arnold (1991, 1992) proposes that this evolutionary step in socioeconomic complexity occurred around 700–800 years ago.

The period between 2,500 and 800 years ago is marked by increased cultural complexity and technological innovation. Fishing and sea mammal hunting became increasingly important, corresponding to development of the *tomol* (a plank canoe), single-piece shell fishhooks, and harpoons (Glassow 1996; King 1990). The bow and arrow also was introduced during this period (Glenn 1990, 1991). Sites in San Luis Obispo County suggest that use of terrestrial mammals remained high. Proportions of imported obsidian continued to increase during this period (Jones et al. 1993).

Arnold (1992) proposes that the complex Chumash sociopolitical system known at historic contact evolved substantially during a brief period between A.D. 1150 and 1300, which she terms the Middle-Late Transitional Period. Arnold infers that decreased marine productivity caused by elevated sea-surface temperatures resulted in subsistence stress that allowed an elite population to control critical resources, labor, and key technologies, resulting in hierarchical social organization and a monetary system. Although the issue of elevated sea-surface temperatures has been questioned (e.g., Kennett 1998) and the inference of marine degradation and subsistence stress has been challenged (e.g., Raab et al. 1995; Raab and Larson 1997), the full emergence of Chumash cultural complexity around this time is generally accepted.

On Vandenberg AFB and in the Santa Barbara Channel region, population densities reached peak levels between 700 years ago and historic contact (Glassow 1990, 1996). Higher numbers of *Olivella* shell beads reflect increased exchange between the Channel Islands, the Santa Barbara mainland, and Vandenberg AFB. Increased subsistence diversity is apparent. Although shellfish continued to be a dietary staple in the Vandenberg area, the use of fish and birds increased, proportions of secondary species in shellfish assemblages increased (Glassow 1990), and dietary expansion is evident (Lebow and Harro 1998). Correspondingly, the range and diversity of site types increased as a greater range of habitats and resources was used (Glassow 1990; Lebow and Harro 1998; Woodman et al. 1991). In San Luis Obispo County, the settlement system appears to have changed substantially after 700 B.P. as residential bases along the coast were abandoned in favor of habitation sites farther inland. Coastal sites were used to obtain resources during short-term occupations (Breschini and Haversat 1988; Greenwood 1972; Jones et al. 1994; Jones and Waugh 1995). In addition, proportions of imported obsidian decreased substantially during this period (Jones et al. 1994).

Ethnohistory

People living in the Vandenberg AFB area prior to historic contact are grouped with the Purisimeño Chumash (Greenwood 1978; King 1984; Landberg 1965), one of several linguistically related members of the Chumash culture. Their social organization, traditions, cosmology, and material culture are described by Blackburn (1975), Grant (1978a, 1978b, 1978c, 1978d), Greenwood (1978), Hudson et al. (1977), Hudson and Blackburn (1982, 1985, 1986), Hudson and Underhay (1978), Johnson (1988), and Landberg (1965).

Available historical accounts and translations of early explorers' observations in the Santa Barbara Channel area indicate that the Chumash people lived in large, densely populated villages with well-built structures (e.g., Bolton 1926, 1931; Engelhardt 1933; Fages 1937; Moriarity and Keistman 1968; Simpson 1939; Teggart 1911; Wagner 1929). With a total Chumash-speaking population estimated at 18,500 (Cook 1976) and employing a maritime economy, the Chumash had a culture that "was as elaborate as that of any hunter-gatherer society on earth" (Moratto 1984:118). Leadership was hereditary and chiefs exercised control over more than one village, reflecting a simple chiefdom social organization. The Chumash engaged in craft specialization and maintained exchange systems (Arnold 1992; Johnson 1988).

Relatively little is known about the Chumash in the Vandenberg region. Explorers noted that villages were smaller and lacked the formal structure found in the Channel area (Greenwood 1978:520). Approximately 22 villages were used by the Purisimeño Chumash at historic contact, with populations between 30 and 200 per village (Glassow 1996:13–14). About five ethnohistoric villages are identified by King (1984:Figure 1) on Vandenberg AFB, along with another five villages in the general vicinity.

Unfortunately, early explorers paid scant attention to Chumash subsistence and settlement systems. Using ethnohistoric, ethnographic, and archaeological data, Landberg (1965) attempted to reconstruct those facets of Chumash lifeways. Chumash subsistence relied primarily on fishing, hunting, and gathering plants (primarily acorns). In the spring, groups left their winter villages for temporary camps where they gathered grasses, roots, tubers, and bulbs. Hunting marine mammals became important during times when seals and sea lions congregated at their rookeries. Bulbs, roots, and tubers also were gathered during the summer months as well, and seeds became important during this season, especially to the people north of Point Concepción. Interior groups moved to the coast during the spring and summer to collect shellfish. Coastal groups returned to their villages in late summer and early fall to harvest large schooling fish such as tuna. Pine nuts were collected in the mountains during the fall months; acorns also were gathered in the late fall. Both of these resources, as well as berries collected during the late summer and early fall, were stored for use during the winter. Hunting also was important during the fall. Winter months were spent in villages, where residents relied primarily on stored foodstuffs as well as occasional fresh fish (Landberg 1965:102–104). Regional variation in subsistence strategies is evident in the ethnohistoric record (Landberg 1965:104–118); in the interior and along the northern coast of Chumash territory, marine resources were less important than acorns, seeds, and game (particularly deer).

Contact with early Euro-American explorers, beginning with the maritime voyages of Cabrillo in A.D. 1542–1543, undoubtedly had an effect on the Chumash culture. The effect may have been profound. Erlandson and Bartoy (1995, 1996) and Preston (1996) convincingly argue that Old World diseases substantially impacted Chumash populations more than 200 years before Spanish occupation began in 1769. Therefore, population estimates based on later Spanish observations and mission records may be much lower than actual populations at the time of initial Spanish contact.

Unquestionably, drastic changes to Chumash lifeways resulted from the Spanish occupation that began with the Portolá expedition in A.D. 1769. The first mission in Chumash territory was established in San Luis Obispo in 1772, followed in short order by San Buenaventura (1782), Santa Barbara (1786), and La Purísima Concepción, established in 1787 in the present location of Lompoc. The Santa Ynez mission was established in 1804. Eventually, nearly the entire Chumash population was under the mission system. During the 1830s, the missions were secularized in an attempt to turn the mission centers into pueblos and make the Indians into Mexican citizens (Grant 1978a).

History

Vandenberg AFB history is divided into the Mission, Rancho, Anglo-Mexican, Americanization, Regional Culture, and Suburban periods (Palmer 1999). The Mission Period began with the early Spanish explorers and continued until 1820. Poor sailing conditions along California's coastline prompted the Spanish to find overland routes for colonization. In August and September of 1769, Captain Gaspar de Portolá led an expedition that crossed through the Vandenberg AFB area on its way to establish a mission at Monterey. A diary of the expedition was kept by Fray Juan Crespi. Reconstruction of the expedition route suggests that they camped at several locations in the Vandenberg region, including Jalama Beach, the ethnohistoric Chumash village of *Nocto* near Point Pedernales, the mouth of the Santa Ynez River, and a temporary Chumash encampment adjacent to a large pond just north of San Antonio Creek (Bradley 1994:16; Roberts 1984:11-2–11-3).

In 1776, Juan Bautista de Anza led an expedition of settlers to establish San Francisco, following the route used by Portolá through the Vandenberg AFB region. Fray Pedro Font kept a detailed diary of the journey (Bolton 1931), indicating that the expedition camped near Jalama Beach on February 27, and near the mouth of the Santa Ynez River the next day. On February 29, they crossed the river and traveled northeast for four leagues (approximately 10 miles), camping at the same pond where Portolá had camped in 1769 (Bradley 1994:17; Roberts 1984:11-5).

The Mission Period continued until 1820. Established in 1787, Mission la Purísima Concepción encompassed the area between Gaviota and Guadalupe. Farming and ranching were the primary economic activities at the Mission, which was responsible for supplying the Santa Barbara Presidio with food supplies. The Mission had 4,000 head of sheep by 1800; by 1812 they numbered 12,000 and by 1821 the count peaked at 23,546. Missionaries had the Chumash weave wool blankets for the Santa Barbara Presidio. Approximately 14,000 sheep remained when the Mission closed in 1835. In addition to sheep, wheat, barley, corn, peas, and beans were grown at Mission La Purísima. Agricultural activities primarily occurred along the major streams such as San Antonio Creek and the Santa Ynez River (Palmer 1999:2).

The Rancho Period of Vandenberg AFB history began in 1820 and continued until 1845 (Palmer 1999). Following secularization in 1834, the Alta California government granted former mission lands to Mexican citizens as ranchos. Project locations on North Vandenberg AFB lie within Rancho Jesus Maria, which originally encompassed 42,184 acres and was granted to Lucas, Antonio, and Jose Olivera in 1837. By 1839, Antonio and Jose Olivera had sold their part of the land grant to Jose Valenzuela, who, in 1847, sold a one-third share to Don Pedro Carrillo and a one-third share to Lewis T. Burton. Project locations on South Vandenberg AFB are within Rancho Lompoc, which was granted to Joaquin and José Carrillo in 1837 and originally encompassed 42,085 acres. Little improvement was made to the rancho except for an isolated adobe in the extreme northeast corner of the land grant. Cattle ranching was the primary economic activity during the Rancho Era; in the 1840s cattle were so abundant that only the hides had any value. The Carrillos raised cattle on Rancho Lompoc, which were sold to miners in the north. Fishing and trapping became important economic activities during this period (Palmer 1999:7–13).

The Bear Flag Revolt and the Mexican War marked the beginning of the Anglo-Mexican Period (1845–1880). Cattle ranching continued to flourish during the early part of this period, with as many as 500,000 cattle in Santa Barbara County during the 1850s. However, severe droughts during the 1860s decimated cattle herds and less than 5,000 cattle remained in the entire county. The combination of drought and change in government from Mexican to the United States caused substantial changes in land ownership. By 1851, approximately 42 percent of the land grants were owned by non-Mexicans; by 1864, after a few years of drought, 90 percent of the southern California ranchos were mortgaged. The various shares in Rancho Jesus Maria changed hands, with Lewis Burton increasing his holdings. His son, Ben Burton, inherited all of Rancho Jesus Maria upon the death of Burton in 1879. Tax problems forced the Carrillos to sell Rancho Lompoc to Thomas More in 1859, who sold the land 4 years later to a consortium of William Hollister, Thomas Dibblee, and Joseph Cooper. This group was largely responsible for returning ranching to the area after the drought years by importing sheep, which required less water and forage than cattle and thus were better able to survive the dry years. However, the consortium dissolved in 1873 and the rancho was subdivided. Sheep ranching and grain farming replaced the old rancho system during this period. Dairy farming became an important economic activity, particularly as Swiss-Italians immigrated into the area. Early roads were

established during the 1860s and 1870s to obtain supplies that were surfed in at Point Sal. Farming remained a limited activity, due in part to the difficulty of shipping to markets. Lompoc was established during this period by the Lompoc Temperance Colony (Palmer 1999).

Increased population densities characterize the Americanization Period (1880–1915). The railroad reached the area in the late 1890s, and providing a more efficient means of shipping and receiving goods and supplies, which in turn increased economic activity. Ranching continued and agriculture increased, particularly with development of steam-powered threshers. Row crops became increasingly common, and sugar beets were one of the most economically important crops. Dairy farming also increased, particularly on South Vandenberg AFB, and the population of the Italian-Swiss ethnic community continued to grow. The former Rancho Lompoc was further subdivided for ranches, dairies, and farms in the Bear Creek, Surf, and La Salle Canyon areas. Oil exploration began in earnest during this period. Union Oil began to purchase Rancho Jesus Maria property in 1903; they ultimately obtained subsurface rights to 120,000 acres in the area. Ben Burton leased the former Rancho Jesus Maria for grazing and farming during the early part of the Americanization Period. However, by 1900 the rancho was divided into four parcels and sold. These four parcels were further subdivided by 1906. Edwin Marshall formed the Jesus Maria Rancho Corporation in December of 1906; by the 1920s the Marshall Ranch encompassed 52,000 acres and prospered by raising cattle and beets (Palmer 1999).

Agriculture continued to dominate the economy during the Period of Regional Culture (1915–1945). As many as 150 dairies operated in the area during this period, although the number of dairies decreased as farmland became more profitable for row crops and the dairy industry switched from an emphasis on butter and cream to milk. Peas and beans were important crops in the area. Migrant workers were attracted to the area, and a camp was established in the Bear Creek vicinity. Surf became a popular recreation destination; in 1933, nearly 12,600 people visited Ocean Park. Crude homes were constructed at the park, and many Lompoc residences would spend their summers at Surf. During World War II, the Salvation Army opened a USO club at Surf, which entertained approximately 30,000 troops per month. Ranching and farming continued on the Marshall Ranch during the early part of the Period of Regional Culture. In 1935, it converted to a dude ranch operation known as Marshallia Ranch, catering to Hollywood personalities. The ranch was sold to Frank Long upon the death of Edwin Marshall in 1937. Cattle ranching and guest operations continued until the start of World War II, when the property was condemned for Camp Cooke. All ranching, farming, and dairy farming in the Vandenberg AFB area was substantially reduced when Camp Cooke was established in 1941. This army training facility was built on approximately 90,000 acres along the coast, and included the area of Rancho Jesus Maria. Camp Cooke was deactivated at the end of World War II (Palmer 1999).

The Suburban Period (1945–1965) began with the end of World War II. After Camp Cooke was deactivated, the Army continued the historic tradition and leased much of the area for ranching and farming. Oil drilling reached its peak during this period. Most of the Suburban Period is characterized by military use of the area. Camp Cooke was reactivated in 1950 for training during the Korean War. It was put into caretaker status from 1953 to 1956. The Cantonment area became so overgrown that sheep were used to manage the vegetation and reduce the fire hazard. In November of 1956, the army transferred 64,000 acres of North Camp Cooke to the Air Force, and it was renamed the Cooke Air Force Base (Palmer 1999). In 1958 the base had its first missile launch, the Thor, and was renamed Vandenberg AFB. The southern section of the current base was transferred to the Air Force from Army and Navy control in 1964 (Vandenberg AFB 1992). Post-transfer use of both North and South Vandenberg AFB has related primarily to the construction and operation of missile launch and support facilities. Specific activities include management of the launch, testing, and evaluation of ballistic missile and space systems for the DOD, and operation of the Western Range (Science Applications International Corporation [SAIC] 1995; Vandenberg AFB 1992).

Tables listing archaeological studies within 1.0 mile of buildings slated for demolition.

Table C-1. Archaeological studies within 1.0 mile of Buildings 98 and 99.

Reference (listed chronologically)	VAFB Reference Number	UCSB Reference Number
Spanne (1978)		E-288
Stone and Haley (1981)	VAFB-1981-06	V-15
Spanne (1981)	VAFB-1981-15	
Neff (1982)	VAFB-1982-05	V-9
WESTEC Services, Inc. (1984)	VAFB-1984-02	V-20
Greenwood and Foster (1984a)	VAFB-1984-12	
Rudolph (1988b)	VAFB-1988-09	V-202
Berry (1988a)	VAFB-1988-10	
Berry (1989)	VAFB-1989-02	
Environmental Solutions, Inc. (1989b)	VAFB-1989-07	V-188
Bergin (1989a)	VAFB-1989-12	V-115
Environmental Solutions, Inc. (1990c)	VAFB-1990-22a	
Berry (1992)	VAFB-1992-05	
Cagle et al (1995)	VAFB-1995-04	
Cagle and McDowell (1995)	VAFB-1995-06	
Eisentraut (1995)	VAFB-1995-11	V-153
Stone et al (1995)	VAFB-1995-15	
SAIC (1995d)	VAFB-1995-16	
Hyder et al (1996)	VAFB-1996-13	V-158
Stevens and Crane (1996)	VAFB-1996-06	V-304
Carbone and Mason (1998)	VAFB-1998-03	V-258
Lebow et al. (2004)		V-328

Table C-2. Archaeological studies within 1.0 mile of Buildings 470, 480, 484, and 488.

Reference (listed chronologically)	VAFB Reference Number	UCSB Reference Number
Glassow et al. (1976)	VAFB-1976-01	V-58
Stone and Haley (1981)	VAFB-1981-06	V-15
Spanne (1981)	VAFB-1981-15	
Neff (1982)	VAFB-1982-05	V-9
WESTEC Services, Inc. (1984)	VAFB-1984-02	V-20
Greenwood and Foster (1984a)	VAFB-1984-12	V-26
Greenwood and Foster (1984b)		V-82
Rudolph (1988b)	VAFB-1988-09	V-202
Berry (1989)	VAFB-1989-02	
Environmental Solutions, Inc. (1989b)	VAFB-1989-07	V-188
King (1989)	VAFB-1989-11	
Bergin (1989a)	VAFB-1989-12	V-115
Bergin (1990)	VAFB-1990-03	
Gard et al. (1990)	VAFB-1990-10	
Kirkish 1990	VAFB-1990-12	
Environmental Solutions, Inc. (1990b)	VAFB-1990-17	
Environmental Solutions, Inc. (1990c)	VAFB-1990-22a	
Environmental Management Operations (1991)	VAFB-1991-01	
Berry (1992)	VAFB-1992-05	
Osland (1993c)		V-248
Cagle et al (1995)	VAFB-1995-04	
Eisentraut (1995)	VAFB-1995-11	V-153
Stone et al (1995)	VAFB-1995-15	
Sanderson and Crane (1996)	VAFB-1996-06	
Carbone and Mason (1998)	VAFB-1998-03	V-258
Oglesby (2001)	VAFB-2001-06	V-278
Owen and Lebow (2003)	VAFB-2003-08	V-325

Table C-3. Archaeological studies within 1.0 mile of Building 535.

Reference (listed chronologically)	VAFB Reference Number	UCSB Reference Number
Glassow et al. (1976)	VAFB-1976-01	V-6
Essex and Abbott (1980)	VAFB-1980-04	
Spanne (1980a)	VAFB-1980-06	
Spanne (1980b)	VAFB-1980-07	V-207
Neff (1982)	VAFB-1982-05	V-9
WESTEC Services, Inc. (1984)	VAFB-1984-02	V-20
Greenwood (1984)	VAFB-1984-07	
Gibson (1984)	VAFB-1984-17	
WESTEC Services, Inc. (1985)	VAFB-1985-03	V-27
Gibson and Osland (1985)	VAFB-1985-06	
Gibson (1985c)	VAFB-1985-07	
Martin Marietta Corporation (1985)	VAFB-1985-09	
Gibson and Jackson (1985)	VAFB-1985-21	
Jackson (1985)	VAFB-1985-26	
Martin Marietta Corporation (1986)	VAFB-1986-05	
Gibson (1986a)	VAFB-1986-07	
Gibson (1986e)	VAFB-1986-15	
Moore et al. (1988)	VAFB-1988-05	E-950
Farraro et al. (1988)	VAFB-1988-12	V-227
Environmental Solutions 1988	VAFB-1988-19	
King (1989)	VAFB-1989-11	
Bergin (1989a)	VAFB-1989-12	V-115
Bergin (1990)	VAFB-1990-02	
Gard et al. (1990)	VAFB-1990-10	
Bergin et al. (1990)	VAFB-1990-15	
Environmental Solutions, Inc. (1990b)	VAFB-1990-17	
Schmidt and Bergin (1990)	VAFB-1990-18	
Glassow (1990)	VAFB-1990-21	
Environmental Solutions, Inc. (1990c)	VAFB-1990-22a	
Maschner et al (1991)	VAFB-1991-10	
Snethkamp and Munns (1991)	VAFB-1991-11	
Thorne (1993)	VAFB-1993-02	
Cagle and McDowell (1995)	VAFB-1995-06	
Eisentraut (1995)	VAFB-1995-11	V-153
Woodman et al (1995)	VAFB-1995-12	
Carbone and Mason (1998)	VAFB-1998-03	V-258
Denardo and Gerber (1998)	VAFB-1998-04	
Lebow et al. (2002)	VAFB-2002-01	V-348
Lebow et al. 2003	VAFB-2003-11	
Hamilton et al. 2004		
Lebow (2004)		V-334

Table C-4. Archaeological studies within 1.0 mile of Building 702.

Reference (listed chronologically)	VAFB Reference Number	UCSB Reference Number
Glassow et al. (1976)	VAFB-1976-01	V-6
Stone and Haley (1981)	VAFB-1981-06	V-15
Neff (1982)	VAFB-1982-05	V-9
WESTEC Services, Inc. (1984)	VAFB-1984-02	V-20
WESTEC Services, Inc. (1985)	VAFB-1985-03	V-27
Harmsworth Associates (1987)	VAFB-1987-06	
Greenwood and Associates (1987)	VAFB-1987-12	V-184
Bergin (1988a)	VAFB-1988-01	
King et al. (1988)	VAFB-1988-02	V-250
Moore et al. (1988)	VAFB-1988-05	E-950
Bergin (1988e)	VAFB-1988-18	V-233
Environmental Solutions (1989b)	VAFB-1989-07	V-188
Berry (1989)	VAFB-1989-09	
King (1989)	VAFB-1989-11	
Bergin et al (1989)	VAFB-1989-12	
Bergin (1989)	VAFB-1989-13	
Bergin (1990)	VAFB-1990-01	
Bergin (1990)	VAFB-1990-03	
Environmental Solutions, Inc. (1990a)	VAFB-1990-06	
Tetra Tech, Inc. (1990)	VAFB-1990-09	V-226
Schmidt and Bergin (1990)	VAFB-1990-18	
Snethkamp and Munns (1991)	VAFB-1991-09	V-138
Chambers Group, Inc. (1993)	VAFB-1993-11	
Gerber (1994)	VAFB-1994-02	
Carbone and Mason (1998)	VAFB-1998-03	V-258

Table C-5. Archaeological studies within 1.0 mile of the SLC-4 demolition project area.

Reference (listed chronologically)	VAFB Reference Number	UCSB Reference Number
Spanne and Glassow (1974)	VAFB-1974-01	V-77
Glassow et al. (1976)	VAFB-1976-01	V-58
Spanne (1980)	VAFB-1980-07	V-207
Stone and Haley (1981)	VAFB-1981-06	V-15
Haley (1981)	VAFB-1981-08	V-239
Neff (1982)	VAFB-1982-05	V-9
Spanne (1983)	VAFB-1983-13	V-91
Tracer Technologies, Inc. (1984)		V-39
WESTEC Services, Inc. (1984)	VAFB-1984-02	V-20
Schilz (1985)	VAFB-1985-03	V-27
Harmsworth Associates (1987)	VAFB-1987-06	
Greenwood and Associates (1987)	VAFB-1987-12	V-184
Bergin (1988d)	VAFB-1988-01	
King et al. (1988)	VAFB-1988-02	V-250
Bergin (1988c)	VAFB-1988-03	
Bergin (1988e)	VAFB-1988-04	
Moore et al. (1988)	VAFB-1988-05	E-950
Ferraro et al. (1988)	VAFB-1988-12	V-227
Bergin (1988a)	VAFB-1988-18	V-233
Gibson (1989)	VAFB-1989-06	
Environmental Solutions, Inc. (1989b)	VAFB-1989-07	V-188
Berry (1989)	VAFB-1989-09	V-185
King (1989)	VAFB-1989-11	
Bergin and King (1989)	VAFB-1989-12	
Bergin (1989a)	VAFBM-1989-13	
Bergin (1990b)	VAFBM-1990-01	
Bergin (1990c)	VAFBM-1990-02	
Bergin (1990a)	VAFBM-1990-03	
Environmental Solutions, Inc. (1990b)	VAFB-1990-06	
Gard et al. (1990)	VAFB-1990-10	
Environmental Solutions, Inc. (1990d)	VAFB-1990-17	
Schmidt and Bergin (1990)	VAFB-1990-18	
Environmental Solutions, Inc. (1990a)	VAFB-1990-22	
Snethkamp and Munns (1991)	VAFB-1991-09	V-138
Osland (1993a)		
Kirkish (1993)	VAFB-1993-10	V-189
Chambers Group, Inc. (1993)	VAFB-1993-11	
Gerber (1994)	VAFB-1994-02	
Woodman, Cagle, and McDowell (1995)	VAFB-1995-08	V-259
Carbone and Mason (1998)	VAFB-1998-03	V-258

Table C-6. Archaeological studies within 1.0 mile of SLC-3.

Reference (listed chronologically)	VAFB Reference Number	CCIC Reference Number
Benson (1969)	VAFB-1969-01	
Spanne (1970)	VAFB-1970-01	
Spanne (1974)	VAFB-1974-02	V-238
Glassow et al. (1976)	VAFB-1976-01	V-58
Doelle (1977)	VAFB-1977-02	
Spanne (1979)	VAFB-1979-02	
Spanne (1980)	VAFB-1980-07	E-995
Stone and Haley (1981)	VAFB-1981-06	
Greenwood and Foster (1981)	VAFB-1981-09	V-26
Neff (1982)	VAFB-1982-05	V-9
Schilz et al. (1984)	VAFB 1984-02	V-20
Greenwood and Foster (1984a)	VAFB-1984-12	
Wilcoxon (1984)	VAFB-1984-16	V-29
WESTEC Services Inc. (1985)	VAFB-1985-03	V-27
Dames and Moore (1985)	VAFB-1985-18	
Environmental Solutions (1988)	VAFB-1988-19	
Bergin (1988b)	VAFB-1988-03	
Bergin (1988c)	VAFB-1988-03a	
Bergin (1988d)	VAFB-1988-03b	
Bergin (1988e)	VAFB-1988-04, -04b	
Ferraro et al. (1988a)	VAFB-1988-12	
Ferraro et al. (1988b)	VAFB-1988-12a	
Harmsworth Associates (1988)	VAFB-1988-17	V-254
Environmental Solutions (1989b)	VAFB-1989-07	V-188
Berry (1989)	VAFB-1989-09	V-185
Bergin and King (1989)	VAFB-1989-12	
Bergin (1989b)	VAFB-1989-12a	V-115
Environmental Solutions (1989c)	VAFB-1989-12b	
Environmental Solutions (1989d)	VAFB-1989-12c	
Bergin(1990)	VAFBM-1990-03	
Environmental Solutions Inc. (1990a)	VAFB-1990-06	
Environmental Solutions Inc. (1990b)	VAFB-1990-17, -17a	
Gard et al. (1990)	VAFB-1990-10	
Kirkish (1990)	VAFB-1990-12	
Schmidt and Bergin (1990)	VAFB-1990-18, -18a, -18b	
Snethkamp and Munns (1991)	VAFB-1991-09	V-138
Alford et al. (1991a)	VAFB-1991-15	
Alford et al. (1991b)	VAFB-1991-16	
York (1992)	VAFB-1992–04	V-137
Tetra Tech, Inc. (1993)	VAFB-1993-01	V-195
Mann et al. (1993)	VAFB-1993-05	V-136
Kirkish (1993)	VAFB-1993-10	V-189
Chambers Group, Inc. (1993)	VAFB-1993-11	
Gerber (1994)	VAFB-1994-02	
Petraglia and Crane (1994a, 1994b)	VAFB-1994-28, 28a	
Harro et al. (1996)		V-161
Lebow (1997)	VAFB-1997-27	
Carbone and Mason (1998)	VAFB-1998-03	
Wilcoxon Archaeological Consultants (1998)	VAFB-1998-10	
Palmer (1999)	VAFB-1999-09	
Lebow (1999)	VAFB-1999-17	
Palmer (2000)	VAFB-2000-15, -15a	
Lebow (2002)	VAFB-2002-02	V-292

Table C-7. Archaeological studies within 1.0 mile of Building 946.

Reference (listed chronologically)	VAFB Reference Number	UCSB Reference Number
Glassow et al. (1976)	VAFB-1976-01	V-58
Spanne (1976)	VAFB-1976-02	
Doelle (1977)	VAFB-1977-02	
Spanne (1979b)	VAFB-1979-02	
Spanne (1980)	VAFB-1980-07	V-207
Haley (1981)	VAFB-1981-08	V-239
Neff (1982)	VAFB-1982-05	V-9
WESTEC Services, Inc. (1984)	VAFB-1984-02	V-20
Dillon (1984)	VAFB-1984-27	V-87
WESTEC Services, Inc. (1985)	VAFB-1985-03	V-27
Gibson (1986b)	VAFB-1986-09	
Gibson (1986a)	VAFB-1986-14	
Harmsworth Associates (1987)	VAFB-1987-06	
Bergin (1988d)	VAFB-1988-01	
Moore et al. (1988)	VAFB-1988-05	E-950
Ferraro (1988)	VAFB-1988-12	V-227
Gibson and Schuyler (1988)	VAFB-1988-15	
Bergin (1988b)	VAFB-1988-17	V-254
Dillon et al. (1989)		
Environmental Solutions, Inc. (1989a)	VAFB-1989-05	
Environmental Solutions, Inc. (1990b)	VAFB-1990-06	
Gard et al. (1990)	VAFB-1990-10	
Snethkamp and Munns (1991)	VAFB-1991-09	V-138
Stone (1993)	VAFB-1993-05	V-136
Bowser (1990)	VAFB-1994-07	V-141
Cole (1994)	VAFB-1994-10	V-234
Eisentraut (1995)	VAFB-1995-11	V-153
SAIC (1995b)	VAFB-1995-17	
Clark (1997)	VAFB-1997-01	V-159
Carbone and Mason (1998)	VAFB-1998-03	V-258
Harro and Lebow (1999)	VAFB-1999-16	
Hodges and Lebow (2001)	VAFB-2001-02	V-283
Lebow et al. (2001)	VAFB-2001-03	V-281

Table C-8. Archaeological studies within 1.0 mile of the Santa Ynez Water Plant.

Reference (listed chronologically)	VAFB Reference Number	UCSB Reference Number
Glassow (1977)	VAFB-1977-01	V-5
Bamforth (1979)		V-1
WESTEC Services, Inc. (1981)	VAFB-1981-04	V-16
Neff (1982)	VAFB-1982-05	V-9
Colten (1983)		E-272
WESTEC Services, Inc. (1984)	VAFB-1984-02	V-20
Gibson (1984)	VAFB-1984-21	V-41
King et al. (1985)	VAFB-1985-25	V-35
Foster (1985b)	VAFB-1985-28	V-100
Bowser et al. (1986)	VAFB-1986-02	V-114
Berry (1988)	VAFB-1988-11	
Bergin (1989b)	VAFB-1989-12	V-115
Environmental Solutions, Inc. (1990c)	VAFB-1990-06	
Jaffke (1990)	VAFB-1990-07	V-123
Gard et al. (1990)	VAFB-1990-10	
Gibson (1990)	VAFB-1990-16	V-129
Peter and Dondero (1991)	VAFB-1991-07	E-1232
Cagle (1995)	VAFB-1995-05	V-148
McKim and Price (1997)	VAFB-1996-12	V-162
Clark (1997)	VAFB-1997-01	V-159
Harro and Ryan (1997)	VAFB-1997-09	V-175
Carbone and Mason (1998)	VAFB-1998-03	V-258
Gibson (1985)	VAFBM-1985-10	V-107
Denardo (1998)	VAFBM-1998-02	V-212

Table C-9. Archaeological studies within 1.0 mile of Building 1505.

Reference (listed chronologically)	VAFB Reference Number	UCSB Reference Number
Colten (1983)		E-272
Glassow et al (1976)	VAFB-1976-01	V-6
Glassow (1977)	VAFB-1977-01	V-5
WESTEC Services, Inc. (1981)	VAFB-1981-04	V-16
Neff (1982)	VAFB-1982-05	V-9
Greenwood (1984)	VAFB-1984-12	
Gibson (1985)	VAFB-1985-10	
King et al. (1985)	VAFB-1985-25	V-35
Gibson (1985b)	VAFB-1985-27	
Gibson (1987b)	VAFB-1987-09	
Environmental Solutions (1988)	VAFB-1988-19	
Bergin (1989a)	VAFB-1989-12	V-115
Glassow (1990)	VAFB-1990-21	
Woodman et al (1991)	VAFB-1991-06	
Peter and Dondero (1991)	VAFB-1991-07	E-1232
Tetra Tech, Inc. (1993)	VAFB-1993-01	V-1
SAIC (1994a)	VAFB-1994-04	
SAIC (1994f)		E-1707
Crane (1994)	VAFB-1994-15	
Crane (1995)	VAFB-1995-07	
Eisentraut (1995)	VAFB-1995-11	V-153
Lockheed Martin (1998)	VAFB-1998-01	
Carbone and Mason (1998)	VAFB-1998-03	V-258
Hodges et al. (2000)	VAFB-2000-04	V-276
Lebow (2000)		V-284
Gibson and Parsons (2002)	VAFB-2002-02	V-332
Linder (2004a)		V-346
Linder (2004b)		

Table C-10. Archaeological studies Within 1.0 mile of 576 FLTS Munitions Storage.

Reference (listed chronologically)	VAFB Reference Number	UCSB Reference Number
Colton (1983)		E-272
Glassow et al (1976)	VAFB-1976-01	V-6
Glassow (1977)	VAFB-1977-01	V-5
WESTEC Services, Inc. (1981)	VAFB-1981-04	V-16
Neff (1982)	VAFB-1982-05	V-9
Greenwood (1984)	VAFB-1984-12	
King et al. (1985)	VAFB-1985-25	V-35
Gibson (1985b)	VAFB-1985-27	
Gibson (1987b)	VAFB-1987-09	
Environmental Solutions 1988	VAFB-1988-19	
Bergin et al (1989)	VAFB-1989-12	
Glassow (1990)	VAFB-1990-21	
Peter and Dondero (1991)	VAFB-1991-07	E-1232
Tetra Tech, Inc. (1993)	VAFB-1993-01	V-1
SAIC (1994a)	VAFB-1994-04	
SAIC (1994f)		E-1707
Crane (1994)	VAFB-1994-15	V-157
Crane (1995)	VAFB-1995-07	
Eisentraut (1995)	VAFB-1995-11	V-153
Lockheed Martin (1998)	VAFB-1998-01	
Carbone and Mason (1998)	VAFB-1998-03	V-258
Hodges et al (2000)	VAFB-2000-04	V-276
Lebow (2000)		V-284
Gibson and Parsons (2002)	VAFB-2002-02	V-332
Linder (2004a)		V-346
Linder (2004b)		

Table C-11. Archaeological studies within 1.0 mile of ABRES A Facility (Building 1783).

Reference (listed chronologically)	VAFB Reference Number	UCSB Reference Number
Glassow (1977)	VAFB-1977-01	V-5
Doelle (1977)	VAFB-1977-02	
HDR Sciences (1979)		V-2
Spanne (1979b)	VAFB-1979-03	
Essex and Abbott (1980)	VAFB-1980-04	
Craig (1980)	VAFB-1980-13	
WESTEC Services, Inc. (1981)	VAFB-1981-04	V-16
Snethkamp (1981)	VAFB-1981-13	V-213
HDR Sciences (1982)	VAFB-1981-19	V-8
Moore and Snethkamp (1982)	VAFB-1982-06	
Brown (1984)	VAFB-1984-23	
Chambers Consultants and Planners (1984)	VAFB-1984-26	V-176
URS-Berger (1985)	VAFB-1985-04	
Tetra Tech, Inc. (1987)	VAFB-1987-05	
Tetra Tech, Inc. (1988)	VAFB-1988-14	
Carbone (1988)	VAFB-1988-16	
Tetra Tech, Inc. (1990)	VAFB-1990-09	V-226
Advanced Sciences, Inc. (1991)	VAFB-1991-05	
Tetra Tech, Inc. (1991)	VAFB-1991-08	
Osland (1992b)		V-139
Osland (1993b)	VAFB-1993-03	V-190
Weitze (1994)	VAFB-1994-09	
Carbone and Mason (1998)	VAFB-1998-03	V-258
Mirro and Lebow (2003)	VAFB-2003-01	

Table C-12. Archaeological studies within 1.0 mile of the ABRES B Complexes.

Reference (listed chronologically)	VAFB Reference Number	UCSB Reference Number
HDR Sciences (1979)		V-2
Spanne (1979b)	VAFB-1979-03	
Essex and Abbott (1980)	VAFB-1980-04	
Bixler et al. (1980)	VAFB-1980-08	
Craig (1980)	VAFB-1980-13	
WESTEC Services, Inc. (1981)	VAFB-1981-04	V-16
Snethkamp (1981)	VAFB-1981-13	V-213
HDR Sciences (1982)	VAFB-1981-19	V-8
Moore and Snethkamp (1982)	VAFB-1982-06	
Munoz (1983)	VAFB-1983-01	
Air Force Flight Test Center (1983)	VAFB-1983-11	
Brown (1984a)	VAFB-1984-23	
Chambers Consultants and Planners (1984)	VAFB-1984-26	V-176
URS-Berger (1985)	VAFB-1985-04	V-199
Tetra Tech, Inc. (1987a)	VAFB-1987-04	V-112
Tetra Tech, Inc. (1987b)	VAFB-1987-05	V-113
Farraro et al. (1988)	VAFB-1988-12	V-227
Walsh and Gray (1988)		V-200
Tetra Tech, Inc. (1988)	VAFB-1988-14	V-214
Carbone (1988)	VAFB-1988-16	
Harmsworth Associates (1988)	VAFB-1988-17	V-254
Tetra Tech, Inc. (1990)	VAFB-1990-09	V-226
Advanced Sciences, Inc. (1991)	VAFB-1991-05	
Tetra Tech, Inc. (1991)	VAFB-1991-08	V-221
Earth Technology Corp. (1991)	VAFB-1991-12	
Weitze (1994)	VAFB-1994-09	
Carbone and Mason (1998)	VAFB-1998-03	V-258
Hodges and Lebow (2000)	VAFB-2000-07	V-277
Mirro and Lebow (2003b)	VAFB-2003-01	

Table C-13. Archaeological studies within 1.0 mile of the 395-A Launch Facility (Buildings 1853 and 1874).

Reference (listed chronologically)	VAFB Reference Number	UCSB Reference Number
HDR Sciences (1979)		V-2
Spanne (1979b)	VAFB-1979-03	
Essex and Abbott (1980)	VAFB-1980-04	
Craig (1980)	VAFB-1980-13	
WESTEC Services, Inc. (1981)	VAFB-1981-04	V-16
Stone and Haley (1981)	VAFB-1981-06	V-15
Snethkamp (1981)	VAFB-1981-13	V-213
Spanne (1981)	VAFB-1981-18	V-32
HDR Sciences (1982)	VAFB-1981-19	V-8
Neff (1982)	VAFB-1982-05	V-9
Moore and Snethkamp (1982)	VAFB-1982-06	
Air Force Flight Test Center, Edwards AFB (1983)	VAFB-1983-11	
WESTEC Services, Inc. (1984)	VAFB-1984-02	V-20
Brown (1984)	VAFB-1984-23	
Chambers Consultants and Planners (1984)	VAFB-1984-26	V-176
URS-Berger (1985)	VAFB-1985-04	
Foster and Greenwood (1985)	VAFB-1985-12	
Martin Marietta Corporation (1986)	VAFB-1986-05	
Tetra Tech, Inc. (1987)	VAFB-1987-05	
Carbone (1988)	VAFB-1988-16	
Tetra Tech, Inc. (1988)	VAFB-1988-14	
Walsh and Gray (1988)		V-200
Tetra Tech, Inc. (1990)	VAFB-1990-09	V-226
Berry (1990)	VAFB-1990-20	V-128
Tetra Tech, Inc. (1991)	VAFB-1991-08	
Berry (1992)	VAFB-1992-01	
Osland (1992b)		V-139
SAIC (1994c)	VAFB-1994-06	V-209
Weitze (1994)	VAFB-1994-09	
SAIC (1994d)	VAFB-1994-12	
Eisentraut (1995)	VAFB-1995-11	V-153
Clark (1997)	VAFB-1997-01	V-159
Carbone and Mason (1998)	VAFB-1998-03	V-258

Table C-14. Archaeological studies within 1.0 mile of the Atlas 576-C Launch Complex (Building 1895).

Reference (listed chronologically)	VAFB Reference Number	UCSB Reference Number
Doelle (1977)	VAFB-1977-02	
Essex and Abbott (1980)	VAFB-1980-04	
Bixler (1980)	VAFB-1980-08	
Haley and Serena (1980)	VAFB-1980-12	
Craig (1980)	VAFB-1980-13	
WESTEC Services, Inc. (1981)	VAFB-1981-04	V-16
Snethkamp (1981)	VAFB-1981-13	V-213
Moore and Snethkamp (1982)	VAFB-1982-06	
Air Force Flight Test Center, Edwards AFB	VAFB-1983-11	
Brown (1984)	VAFB-1984-23	
Chambers Consultants and Planners (1984)	VAFB-1984-26	V-176
URS-Berger (1985)	VAFB-1985-04	
Gibson and Osland (1985)	VAFB-1985-06	
Tetra Tech, Inc. (1987a)	VAFB-1987-04	V-112
Tetra Tech, Inc. (1987)	VAFB-1987-05	
Carbone (1988)	VAFB-1988-16	
Tetra Tech, Inc. (1988)	VAFB-1988-14	
Walsh and Gray (1988)		V-200
Tetra Tech, Inc. (1990)	VAFB-1990-09	V-226
Tetra Tech, Inc. (1991)	VAFB-1991-08	
Earth Technology (1991)	VAFB-1991-12	
Weitze (1994)	VAFB-1994-09	
Carbone and Mason (1998)	VAFB-1998-03	V-258
Hodges and Lebow (2000)	VAFB-2000-07	V-277
Mirro and Lebow (2003)	VAFB-2003-01	

Table C-15. Archaeological studies within 1.0 mile of Building 1952.

Reference (listed chronologically)	VAFB Reference Number	UCSB Reference Number
Stone and Gamble (1981)		E-330
WESTEC Services (1981)	VAFB-1981-04	
Neff (1982)	VAFB-1982-05	V-9
Air Force Flight Test Center, Edwards AFB (1983)	VAFB-1983-11	
Bamforth (1985)	VAFB-1985-17	
Tetra Tech, Inc. (1987a)	VAFB-1987-04	
Gibson (1987c)	VAFB-1987-10	
Osland (1992a)		V-183
Osland (1992b)		V-139
Carbone and Mason (1998)	VAFB-1998-03	V-258
Linder (2004b)		V-342

Table C-16. Archaeological studies within 1.0 mile of Buildings 1953 and 1958.

Reference (listed chronologically)	VAFB Reference Number	UCSB Reference Number
Spanne (1975)	VAFB-1975-02	
WESTEC Services (1981)	VAFB-1981-04	V-16
Neff (1982)	VAFB-1982-05	V-9
Air Force Flight Test Center, Edwards AFB (1983)	VAFB-1983-11	
Bamforth (1985)	VAFB-1985-17	
Gibson (1987c)	VAFB-1987-10	
Osland (1992b)		V-139
Clark (1997)	VAFB-1997-01	V-159
Carbone and Mason (1998)	VAFB-1998-03	V-258
Hodges and Lebow (2000)		V-277
Parreira et al. (2002)		V-306
Lebow et al (2003)		V-317
Linder (2004a)		V-340
Linder (2004b)		V-342

Table C-17. Archaeological studies within 1.0 mile of Building 1982.

Reference (listed chronologically)	VAFB Reference Number	UCSB Reference Number
WESTEC Services, Inc. (1981)	VAFB-1981-04	V-16
Neff (1982)	VAFB-1982-05	V-9
Air Force Flight Test Center, Edwards AFB (1983)	VAFB-1983-11	
Gibson (1987c)	VAFB-1987-10	
Osland (1992b)		V-139
Clark (1997)		V-159
Carbone and Mason (1998)	VAFB-1998-03	V-258
Hodges and Lebow (2000)		V-277
Parreira et al (2002)		V-306
Lebow et al (2003)		V-317
Linder (2004a)		V-340
Linder (2004b)		V-342

Table C-18. Archaeological studies within 1.0 mile of Building 1995.

Reference (in chronological order)	VAFB Reference Number	CCIC Reference Number
Stone and Gamble (1981)		E-330
Neff (1982)	VAFB-1982-05	V-9
WESTEC Services, Inc. (1984)	VAFB-1984-02	
Bamforth (1985)	VAFB-1985-17	
Gibson (1987c)	VAFB-1987-10	
Woodman and McDowell (1989)	VAFB-1989-08	
Spanne (1990)		E-1770
Kirkish (1990)	VAFB-1990-14	
Carbone and Mason (1998)	VAFB-1998-03	V-258

Table C-19. Archaeological studies within 1.0 mile of Building 1957.

Reference (listed chronologically)	VAFB Reference Number	UCSB Reference Number
WESTEC Services, Inc. (1981)	VAFB-1981-04	V-16
Neff (1982)	VAFB-1982-05	V-9
Air Force Flight Test Center, Edwards AFB (1983)	VAFB-1983-11	
Bamforth (1985)	VAFB-1985-17	
Gibson (1987c)	VAFB-1987-10	
Osland (1992b)		V-139
Clark (1997)	VAFB-1997-01	V-159
Carbone and Mason (1998)	VAFB-1998-03	V-258
Hodges and Lebow (2000)		V-277
Parreira et al (2002)		V-306
Lebow et al (2003)		V-317
Linder (2004a)		V-340
Linder (2004b)		V-342

Table C-20. Archaeological studies within 1.0 mile of Building 1992.

Reference (listed chronologically)	VAFB Reference Number	UCSB Reference Number
WESTEC Services, Inc. (1984)	VAFB-1984-02	
Bamforth (1985)	VAFB-1985-17	
Gibson (1987c)	VAFB-1987-10	
Woodman and McDowell (1989)	VAFB-1989-08	
Kirkish (1990)	VAFB-1990-14	
Carbone and Mason (1998)	VAFB-1998-03	V-258

Table C-21. Archaeological studies within 1.0 mile of Building 20220.

Reference (listed chronologically)	VAFB Reference Number	UCSB Reference Number
WESTEC Services, Inc. (1981)	VAFB-1981-04	V-16
WESTEC Services, Inc. (1982)	VAFB-1982-10	
Chambers Consultants and Planners (1984)	VAFB-1984-26	V-176
Greenwood (1984)	VAFB-1984-12	
Greenwood and Foster (1984a)	VAFB-1984-12	V-26
Rudolph (1984)	VAFB-1984-32	
Foster and Greenwood (1985)	VAFB-1985-12	
Foster (1985a)	VAFB-1985-19	V-23
Gibson (1986b)	VAFB-1986-08	
Gibson (1987a)	VAFB-1987-08	
Rudolph (1988a)	VAFB-1988-08	
Berry (1990)	VAFB-1990-20	V-128
United States Air Force (1990)		V-133
Berry (1991)	VAFB-1991-03	V-131
Berry (1994)	VAFB-1994-01	
SAIC (1994b)	VAFB-1994-05	
SAIC (1994c)	VAFB-1994-06	V-209
SAIC (1994e)	VAFB-1994-16	E-1691
Price et al (1996)	VAFB-1996-03	V-146
Wilcoxon and Haley (1996)	VAFB-1996-07	V-164
Clark (1997)	VAFB-1997-01	V-159
Carbone and Mason (1998)	VAFB-1998-03	V-258
Lebow et al (1998)	VAFB-1998-08	
CEVPC/GIS VAFB (2000)	VAFB-2000-18	
Mirro and Lebow (2003)	VAFB-2003-02	
Owens and Lebow (2003)	VAFB-2003-06	
Parreira (2004)		V-336

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APPENDIX D

Air Quality Analysis

Appendix D – Air Quality Analysis

A detailed engineering analysis for the abandonment or demolition for each facility and structure has not been completed; however, cost estimates, which included equipment usage, were prepared for some of the facilities and structures listed as Phase I and Phase II in the Disposition List. The equipment usage was reviewed to determine the facility or structure with the highest daily equipment usage and therefore the highest daily emissions. The procedures and equations used to calculate the air emissions are detailed below.

Technical Assumptions and Emission Calculation

Proposed Action

The equipment usage found in the Phases I and II cost estimation studies were reviewed to determine the facility or structure with the highest daily equipment usage. Building 488 had the highest daily equipment usage. To obtain a reasonable daily worst-case scenario, equipment usage from Building 470 and from loading fill material at a borrow pit were added to the equipment usage for Building 488. The equipment used for the estimated reasonable daily worst-case scenario is presented in Table D-1. In addition, Table D-1 shows the total estimated equipment usage for Phases I and II. Table D-2 shows the equipment size and load factors, Tables D-3 through D6 show the emissions factors that were used, while Tables D-7 and D-8 show the daily and Phase I emissions. The daily emissions were estimated using 2005 emission factors, while the Phase I emissions were estimated using 2006 emission factors. Table D-9 shows the total Phase II emissions based upon 2007 emission factors.

While facilities in all three phases are similar, the 30 CES/CEV would estimate the air emissions based upon the methodology detailed in this appendix and maintain a calendar year and a 12-month rolling air inventory. After the detailed engineering study is prepared for the demolition or abandonment of each facility, the 30th Civil Engineer Contracts (30 CES/CEC) would submit an Air Force Form 813, *Request for Environmental Impact Analysis* (AF Form 813), to the 30th Space Wing Environmental Flight (30 CES/CEV) with the preferred method of demolition or abandonment for the facility along with a detailed equipment list. When the cumulative calendar year emissions of nitrogen oxide (NO_x), or reactive organic compound (ROC) reach but not exceed 548 lbs/day or 100 tons/year that request would receive clearance, but no further environmental clearances for projects would be given until the following calendar year. At no time will environmental clearances be given if the specific project emissions plus the cumulative calendar year emissions of NO_x, or ROC exceed 548 lbs/day or 100 tons/year.

Sources of air emissions from the proposed action would include combustive and fugitive emissions. Combustive emission would come from construction equipment, employee commuting, and trucks from moving aggregate to the fills sites, recyclable construction and demolition debris to recycle facilities, and non-recyclable materials to the base landfill. Fugitive emissions would come from construction equipment disturbing the sites, crushing and handling of the concrete aggregate, and loading and unloading of fill material. If the demolition contractor proposes to use explosives, the use of explosives would produce combustive emissions. The following sections describe the methodology that would be used to estimate the emissions.

Combustive Emissions

For combustive emissions from construction equipment, the daily emissions were be calculated by multiplying the equipment horsepower, the load factor, the emission factor, and the hours of operation for a day. Project emissions were obtained by multiplying the equipment horsepower, the load factor, the emission factor, and the hours of operation during Phase I. As shown in Table D-2, the default horsepower and load factors from URBEMIS 2002 (Jones & Stokes Associates 2003) were used, unless it was determined that more appropriate horsepower rating based upon the engineering analysis. Emission factors for the construction equipment, also from URBEMIS 2002 (Jones & Stokes Associates 2003), are shown in Table D-3. In the future, if better emission factors and load factors become available, the new data would be used to provide more accurate emissions.

Table D-1.
Equipment usage for Phases I and II.

Equipment	Horse Power	Load Factor	# of Pieces of Equipment	Phase I		Phase II
				Hours/ Day	Total Hours	Total Hours
Air Compressor	65	0.62	2	8	165	162
Backhoe	80	0.465	3	7	561	333
Concrete Trucks[(a)]	25	NA	NA	NA	31	31
Crane	190	0.43	2	7	1029	340
Employees[(a)]	15	NA	18		28797	2793
Forklift	75	0.475	2.5	7	1295	870
Generator	22	0.62	1	6	395	268
Grader	144	0.575	2	7	282	197
Jackhammer	NA	NA	2	6	165	162
Loader	150	0.465	2	8	2082	1361
Loader - Backfill	150	0.465	1	8	258	62
Sawcutting	9	0.73	2	8	70	50
Torch Cutting	NA	NA	4.5	8	3368	498
Trucks – C&D[(a)]	15	NA	20	NA	453	372
Trucks – Concrete[(a)]	15	NA	NA	NA	1787	1588
Trucks – Steel[(a)]	45	NA	2	NA	258	392
Water Truck – Site	250	0.49	2	2	511	415
Concrete Crusher	154	0.78	1	8	89	161.4
Loader – Borrow Pit	150	0.465	1	8	387	395
Water Truck – Borrow Pit	250	0.49	1	2	97	99
Trucks – Import Fill[(a)]	15	NA	20	NA	1523	3613
Fugitive Dust						
Ground Disturbance – Daily[(b)]	5	NA	NA	8	NA	NA
Ground Disturbance – Phase I [(b)]	3	NA	NA	8	4376	4664
Concrete Crushing[(c)]	NA	150	NA	8	8931	16140
Import Fill[(c)]	NA	30	NA	8	11610	11839

Source: Jacobs Engineering 2005
NOTES:
(a) For this source, Horsepower indicates number of miles for a one-way trip, #of Pieces of Equipment indicates the number of one-way trips per day, and Total Hours indicates the total number of one-way trips.
(b) For this source, Horsepower indicates number of acres disturbed in one day and Total Hours indicates the number of hours of disturbance.

(c) For this source, Horsepower indicates rate of crushing or loading in tons pre hour and Total Hours indicates the number of tons of crushing or loading estimated for Phase I.

Table D-2.
Potential construction equipment.

Equipment	Horse Power	Load Factor
Bore/Drill Rigs	218	0.75
Concrete/Industrial Saws	84	0.73
Cranes	190	0.43
Crawler Tractors	143	0.575
Crushing/Processing Equipment	154	0.78
Excavators	180	0.58
Graders	174	0.575
Off-Highway Tractors	255	0.41
Off-Highway Trucks	417	0.49
Other Construction Equipment	190	0.62
Pavers	132	0.59
Paving Equipment	111	0.53
Rollers	114	0.43
Rough-Terrain Forklifts	94	0.475
Rubber-Tired Dozers	352	0.59
Rubber-Tired Loaders	165	0.465
Scrapers	313	0.66
Signal Boards	119	0.82
Skid Steer Loaders	62	0.515
Surfacing Equipment	437	0.49
Tractors/Loaders/Backhoes	79	0.465
Trenchers	82	0.695

Source: Jones & Stokes Associates. 2003, Appendix H.

Table D-3.
Construction equipment emission factors.

Equipment Type/Year	Emission Factors (gm/hp-hr)				Equipment Type/Year	Emission Factors (gm/hp-hr)			
	CO	NOx	PM_{10}	ROG		CO	NOx	PM_{10}	ROG
Bore/Drill Rigs					**Concrete /Industrial Saws**				
2005	8.48	5.79	0.16	1.00	2005	6.81	8.33	0.40	1.00
2006	8.48	5.79	0.16	1.00	2006	7.09	7.96	0.37	1.00
2007	8.48	5.79	0.16	1.00	2007	7.37	7.59	0.34	1.00
2008	8.48	5.79	0.16	1.00	2008	7.64	7.22	0.31	1.00
2009	8.48	5.79	0.16	1.00	2009	7.92	6.85	0.29	1.00
2010	8.48	5.79	0.16	1.00	2010	8.19	6.49	0.26	1.00
Cranes					**Crawler Tractors**				
2005	8.52	6.29	0.26	1.00	2005	6.86	8.39	0.39	1.00
2006	8.52	6.18	0.24	1.00	2006	7.14	8.01	0.37	1.00
2007	8.52	6.05	0.22	1.00	2007	7.41	7.64	0.34	1.00
2008	8.52	5.93	0.19	1.00	2008	7.69	7.27	0.32	1.00
2009	8.52	5.81	0.16	1.00	2009	7.96	6.90	0.29	1.00
2010	8.52	5.81	0.16	1.00	2010	8.24	6.52	0.26	1.00
Crushing /Processing Equipment					**Excavators**				
2005	6.85	8.38	0.40	1.00	2005	8.49	6.11	0.23	1.00
2006	7.13	8.01	0.37	1.00	2006	8.49	5.95	0.20	1.00
2007	7.41	7.64	0.34	1.00	2007	8.49	5.79	0.16	1.00
2008	7.68	7.26	0.32	1.00	2008	8.49	5.79	0.16	1.00
2009	7.96	6.89	0.29	1.00	2009	8.49	5.79	0.16	1.00
2010	8.24	6.52	0.26	1.00	2010	8.49	5.79	0.16	1.00
Graders					**Off-Highway Tractors**				
2005	8.49	6.34	0.28	1.00	2005	6.84	8.36	0.40	1.00
2006	8.49	6.23	0.26	1.00	2006	7.12	7.99	0.37	1.00
2007	8.49	6.13	0.23	1.00	2007	7.39	7.62	0.34	1.00
2008	8.49	6.01	0.21	1.00	2008	7.67	7.25	0.31	1.00
2009	8.49	5.91	0.18	1.00	2009	7.95	6.88	0.29	1.00
2010	8.49	5.79	0.16	1.00	2010	8.22	6.51	0.26	1.00
Off-Highway Trucks					**Other Construction Equipment**				
2005	8.50	6.35	0.28	1.00	2005	6.85	8.38	0.39	1.00
2006	8.50	6.24	0.25	1.00	2006	7.13	8.01	0.37	1.00
2007	8.50	6.13	0.23	1.00	2007	7.41	7.64	0.34	1.00
2008	8.50	6.02	0.21	1.00	2008	7.68	7.27	0.32	1.00
2009	8.50	5.91	0.18	1.00	2009	7.96	6.89	0.29	1.00
2010	8.50	5.80	0.16	1.00	2010	8.24	6.52	0.26	1.00
Pavers					**Paving Equipment**				
2005	8.46	6.19	0.25	1.00	2005	6.83	8.36	0.40	1.00
2006	8.46	6.05	0.22	1.00	2006	7.11	7.98	0.37	1.00
2007	8.46	5.92	0.19	1.00	2007	7.38	7.61	0.34	1.00
2008	8.46	5.77	0.16	1.00	2008	7.66	7.25	0.32	1.00
2009	8.46	5.77	0.16	1.00	2009	7.93	6.87	0.29	1.00
2010	8.46	5.77	0.16	1.00	2010	8.21	6.51	0.26	1.00

Table D-3 (continued)

Equipment Type/Year	Emission Factors (gm/hp-hr)				Equipment Type/Year	Emission Factors (gm/hp-hr)			
	CO	NOx	PM_{10}	ROG		CO	NOx	PM_{10}	ROG
Rollers					**Rough Terrain Forklifts**				
2005	8.49	6.20	0.25	0.99	2005	8.51	6.22	0.25	1.00
2006	8.49	6.06	0.22	0.99	2006	8.51	6.08	0.22	1.00
2007	8.49	5.93	0.19	0.99	2007	8.51	5.94	0.19	1.00
2008	8.49	5.79	0.16	0.99	2008	8.51	5.80	0.17	1.00
2009	8.49	5.79	0.16	0.99	2009	8.51	5.80	0.17	1.00
2010	8.49	5.79	0.16	0.99	2010	8.51	5.80	0.17	1.00
Rubber-Tired Dozers					**Rubber-Tired Loaders**				
2005	6.85	8.37	0.40	1.00	2005	8.51	6.22	0.25	1.00
2006	7.13	8.00	0.37	1.00	2006	8.51	6.08	0.22	1.00
2007	7.40	7.63	0.34	1.00	2007	8.51	5.94	0.19	1.00
2008	7.68	7.26	0.31	1.00	2008	8.51	5.81	0.16	1.00
2009	7.95	6.89	0.29	1.00	2009	8.51	5.81	0.16	1.00
2010	8.23	6.52	026	1.00	2010	8.51	5.81	0.16	1.00
Scrapers					**Signal Boards**				
2005	7.76	7.24	0.33	1.00	2005	6.83	8.35	0.40	1.00
2006	8.13	6.75	0.30	1.00	2006	7.11	7.99	0.37	1.00
2007	8.50	6.26	0.26	1.00	2007	7.38	7.61	0.34	1.00
2008	8.50	6.16	0.24	1.00	2008	7.66	7.24	0.31	1.00
2009	8.50	6.07	0.22	1.00	2009	7.93	6.87	0.28	1.00
2010	8.50	5.98	0.20	1.00	2010	8.20	6.50	0.26	1.00
Skid Steer Loaders					**Surfacing Equipment**				
2005	8.49	5.79	0.16	0.99	2005	6.84	8.36	0.39	1.00
2006	8.49	5.79	0.16	0.99	2006	7.11	7.99	0.37	1.00
2007	8.49	5.79	0.16	0.99	2007	7.39	7.62	0.34	1.00
2008	8.49	5.79	0.16	0.99	2008	7.67	7.25	0.32	1.00
2009	8.49	5.79	0.16	0.99	2009	7.94	6.88	0.29	1.00
2010	8.49	5.79	0.16	0.99	2010	8.22	6.51	026	1.00
Tractors/ Loaders/ Backhoe					**Trenchers**				
2005	6.88	8.41	0.40	1.00	2005	8.49	6.11	0.23	0.99
2006	7.16	8.04	0.37	1.00	2006	8.49	5.95	0.19	0.99
2007	7.44	7.67	0.34	1.00	2007	8.49	5.79	0.16	0.99
2008	7.72	7.30	0.32	1.00	2008	8.49	5.79	0.16	0.99
2009	8.00	6.91	0.29	1.00	2009	8.49	5.79	0.16	0.99
2010	8.27	6.54	0.26	1.00	2010	8.49	5.79	0.16	0.99

Source: Jones & Stokes Associates 2003, Appendix H.

Using the number of employees and truck trips from the submitted AF Form 813, the air emissions from these two sources would be estimated. Vehicular emissions would be estimated by multiplying the number of vehicles per day by the number of trips by the distance traveled by the emission factor. Project emission would be obtained by multiplying the distance traveled by the number of trips employee commuting or material hauling by the emission factor. It is assumed the average, one-way employee commute is 15 miles, while for the trucks hauling materials, the actual mileage from the facility either to the Santa Barbara County line or to the on-base disposal site would be used. The destination for all metal recycling trucks is assumed to out of county, while destination for all the concrete and solid waste hauling trucks is assumed to be on base. Emission factors for commuting employees and trucks hauling materials would be obtained from California Air Resources Board's EMFAC 2002 (v2.2) BURDEN model run by the South Coast Air Quality Management District. The emission factors for employee commuting and hauling trucks are shown in Table D-4.

Table D-4. Mobile emission factors.

Vehicle Type/Year	Emission Factors (pounds/mile)				
	CO	NO_x	PM_{10}	ROG	SO_x
Employee Commuting					
2005	0.015165	0.001634	0.000079	0.001626	0.00001
2006	0.013925	0.001489	0.000080	0.001497	0.000009
2007	0.01282	0.001361	0.000080	0.001383	0.000009
2008	0.011798	0.001245	0.000080	0.001277	0.000009
2009	0.010849	0.001138	0.000081	0.001179	0.000009
2010	0.009954	0.001038	0.000081	0.001087	0.000009
2011	0.009268	0.000952	0.000083	0.001015	0.000009
2012	0.008512	0.000868	0.000083	0.000941	0.000009
2013	0.007818	0.000791	0.000083	0.000874	0.000009
2014	0.007186	0.000721	0.000084	0.000813	0.000009
2015	0.006611	0.000659	0.000084	0.000759	0.000009
Hauling Trucks					
2005	0.006308	0.041541	0.000774	0.001403	0.000404
2006	0.005932	0.038930	0.000730	0.001321	0.000405
2007	0.005520	0.035635	0.000644	0.001227	0.000046
2008	0.005117	0.032442	0.000598	0.001133	0.000046
2009	0.004738	0.029455	0.000559	0.001042	0.000046
2010	0.004335	0.025802	0.000507	0.000948	0.000046
2011	0.004069	0.022117	0.000475	0.000888	0.000046
2012	0.003783	0.019380	0.000438	0.000813	0.000046
2013	0.003551	0.017054	0.000408	0.000749	0.000047
2014	0.003364	0.015100	0.000383	0.000696	0.000047
2015	0.003217	0.013437	0.000362	0.000651	0.000046

Source: onroadEF03_25.xls and onroadHHDT05_25.xls Retrieved from the World Wide Web: http://www.aqmd.gov/ceqa/handbook/onroad/onroad.html.

Fugitive Dust

Fugitive dust would be generated when equipment disturbed the demolition site, concrete is crushed into aggregate, or the aggregate is load into or unloaded from trucks. Maps included AF Form 813 would be used to estimate the area disturbed by the construction equipment. This area would be multiplied by the hours of operation by the emission factor of 3.49 pounds of PM_{10} per acre per hour to estimate the daily emissions (Santa Barbara County Air Pollution Control District [APCD]). The 3.49 pounds per acre per hour includes site watering to achieve a 50% reduction in PM_{10}. The project PM_{10} emissions would be estimated by multiplying the daily emissions by the number of days the site would be disturbed.

As facilities are demolished, the structural concrete would be crushed and used as engineered fill. The fill could be used directly on site or other locations on Vandenberg Air Force Base (AFB), or stockpiled for future projects on Vandenberg AFB. The location of the crushing would be determined by the proponent and could take place on site or at the base landfill. In either case, the crushing operations would produce particulate emissions. The daily throughput or the project total would be multiplied by the emission factor to obtain estimates of the daily and project particulate matter emissions. The emission factors that would be used to estimate crushing emissions are shown in Table D-5.

Table D-5.
Particulate matter emission factors.

Source	Emission Factor	Qualifiers	Source
Ground Disturbance	3.49 lbs of PM_{10}/acre-hr	50% reduction because of watering and PM10 fraction of 0.64	Santa Barbara County APCD; Form APCD-24
Tertiary Crushing – Uncontrolled	0.0024 lbs of PM_{10}/ton	None	AP-42, Table 11.19.2-2; SCC 3-050030-03
Tertiary Crushing – Controlled	0.00054 lbs of PM_{10}/ton	77.7% reduction because of watering	AP-42, Table 11.19.2-2; SCC 3-050020-03
Aggregate loading/unloading	0.0035 lbs of PM_{10}/ton	Mean wind speed of 12 mpg and Moisture Content of 2%	AP-42, 13.2.4

After crushing, the aggregate would require handling as it is placed either onto storage piles or into areas requiring fill. Information on the amounts of aggregate that would be generated or required for fill would be found in the AF Form 813. This information would be used to estimate the particulate matter emissions. The estimated daily or total project aggregate weight would be multiplied by an emission factor to obtain daily or project emissions, respectively. The emission factor would be estimated with the following equation:

$$EF = k(0.0032)\frac{\left(\frac{U}{5}\right)^{1.3}}{\left(\frac{M}{2}\right)^{1.4}} \quad \text{(lbs/ton) [AP-42, 13.2.4]}$$

Where: EF = Emission factor (pounds per tons)

k = Particular size multiplier (dimensionless)

U = Mean wind speed (miles per hour) (12 mph for daily maximum for Vandenberg AFB)

M = Material moisture content (percent)

Particle Size Multiplier for Equation 13.2.4				
< 30 µm	< 15 µm	< 10 µm	< 5 µm	< 2.5 µm
0.74	0.48	0.35	0.20	0.11

$$EF = 0.35 \times (0.0032) \frac{\left(\frac{12}{5}\right)^{1.3}}{\left(\frac{2}{2}\right)^{1.4}} \qquad EF = 0.00112 \frac{(2.4)^{1.3}}{(1)^{1.4}} = 0.0035 \text{ lbs/ton}$$

Explosive Demolition

The demolition contractor may decide the most economical method to demolish a facility is to use explosives to drop the facility to the ground and then cut the facility structure up into manageable pieces. As part of the AF Form 813 package, the contractor would develop an explosive demolition plan that would be reviewed and approved by the 30th Space Wing Safety Office. With estimates of the amount of explosives, the following emission factor would be used to estimate the emissions:

Table D-6.
Explosive demolition emission factors.

Explosive	Composition	Emission Factor (lb/ton)	
		CO	NOx
Dynamite, Straight	20-60% Nitroglycerine/sodium nitrate/wood pulp/calcium carbonate	281	ND
Dynamite, Gelatin	20-100% Nitroglycerin	104	53
RDX	Cyclotrimethlenetrinitroamine	196	ND
PETN	Pentaerythritol	297	ND

Source: U.S. Environmental Protection Agency (EPA) 2003a (Table 13.3-1).

Table D-7.
Estimated daily emissions.

Emission Source	Daily Emissions (Lbs)				
	CO	**NO_x**	**PM_{10}**	**ROC**	**SO_x**
Air Compressor	9.74	11.91	0.56	1.42	0.00
Backhoe	11.86	14.49	0.69	1.73	0.00
Concrete Trucks	0.00	0.00	0.00	0.00	0.00
Crane	21.47	15.87	0.67	2.52	0.00
Employees	8.19	0.88	0.04	0.88	0.01
Forklift	11.69	8.55	0.35	1.38	0.00
Generator	1.24	1.51	0.07	0.18	0.00
Grader	21.70	16.21	0.71	2.55	0.00
Jackhammer	0.00	0.00	0.00	0.00	0.00
Loader	20.95	15.31	0.62	2.45	0.00
Loader - Backfill	10.47	7.65	0.31	1.23	0.00
Sawcutting	1.58	1.93	0.09	0.23	0.00
Torch Cutting	0.00	0.00	0.00	0.00	0.00
Trucks - C&D	3.78	24.92	0.46	0.84	0.24
Trucks - Concrete	0.00	0.00	0.00	0.00	0.00
Trucks - Steel	1.14	7.48	0.14	0.25	0.07
Water Truck - Site	9.18	6.86	0.30	1.08	0.00
Concrete Crusher	14.52	17.75	0.84	2.12	0.00
Loader - Borrow Pit	10.47	7.65	0.31	1.23	0.00
Water Truck -Borrow Pit	4.59	3.43	0.15	0.54	0.00
Trucks - Import Fill	3.78	24.92	0.46	0.84	0.24
Fugitive Dust	0.00	0.00	148.36	0.00	0.00
Total	**166.35**	**187.33**	**155.14**	**21.47**	**0.56**

Table D-8.
Estimated Phase I emissions.

Emission Source	Phase I (Lbs)				
	CO	**NO_x**	**PM_{10}**	**ROC**	**SO_x**
Air Compressor	104.57	117.41	5.43	14.68	0.00
Backhoe	329.50	369.98	17.04	46.16	0.00
Concrete Trucks	9.19	60.34	1.13	2.05	0.63
Crane	1,578.23	1,144.76	45.02	185.22	0.00
Employees	12,029.74	1,286.34	69.11	1,293.25	7.78
Forklift	865.34	618.66	21.96	102.03	0.00
Generator	84.73	95.13	4.40	11.89	0.00
Grader	437.00	320.90	13.13	51.34	0.00
Jackhammer	0.00	0.00	0.00	0.00	0.00
Loader	2,725.53	1,947.14	70.98	319.40	0.00
Loader - Backfill	337.75	241.29	8.80	39.58	0.00
Sawcutting	7.19	8.07	0.38	1.01	0.00
Torch Cutting	0.00	0.00	0.00	0.00	0.00
Trucks - C&D	80.62	529.06	9.92	17.95	5.50
Trucks - Concrete	318.01	2,087.04	39.14	70.82	21.71
Trucks - Steel	137.74	903.95	16.95	30.67	9.40
Water Truck - Site	1,172.57	860.86	35.23	137.86	0.00
Concrete Crusher	168.68	189.34	8.71	23.67	0.00
Loader - Borrow Pit	506.62	361.93	13.19	59.37	0.00
Water Truck -Borrow Pit	222.01	162.99	6.67	26.10	0.00
Trucks - Import Fill	271.03	1,778.71	33.35	60.36	18.50
Fugitive Dust	0.00	0.00	46,169.49	0.00	0.00
Total	21,386.05	13,083.90	46,590.03	2,493.41	63.53
Total (Tons)	10.69	6.54	23.30	1.25	0.03

Table D-9.
Estimated Phase II emissions.

Emission Source	Phase II (Lbs)				
	CO	**NO_x**	**PM_{10}**	**ROC**	**SO_x**
Air Compressor	106.62	109.94	4.92	14.41	0.00
Backhoe	203.17	209.49	9.27	27.40	0.00
Concrete Trucks	10.27	66.28	1.20	2.28	0.09
Crane	521.48	370.60	13.18	61.20	0.00
Employees	1074.04	114.02	6.70	115.87	0.75
Forklift	581.35	406.08	13.02	68.55	0.00
Generator	59.70	61.56	2.75	8.07	0.00
Grader	305.28	220.30	8.36	35.87	0.00
Jackhammer	0.00	0.00	0.00	0.00	0.00
Loader	1781.67	1243.46	40.21	208.79	0.00
Loader - Backfill	81.16	56.65	1.83	9.51	0.00
Sawcutting	5.34	5.50	0.25	0.72	0.00
Torch Cutting	0.00	0.00	0.00	0.00	0.00
Trucks - C&D	61.60	397.69	7.19	13.69	0.51
Trucks - Concrete	262.97	1697.65	30.68	58.45	2.19
Trucks - Steel	194.75	1257.20	22.72	43.29	1.62
Water Truck - Site	952.29	686.69	26.12	111.96	0.00
Concrete Crusher	316.55	326.43	14.53	42.77	0.00
Loader - Borrow Pit	516.61	360.55	11.66	60.54	0.00
Water Truck -Borrow Pit	226.39	163.25	6.21	26.62	0.00
Trucks - Import Fill	598.31	3862.48	69.80	132.99	4.99
Fugitive Dust	0.00	0.00	49,010.18	0.00	0.00
Total	7859.54	11615.82	49,300.77	1042.98	10.15
Total (Tons)	3.93	5.81	24.65	0.52	0.01

References

Jones & Stokes Associates. 2003. Software User's Guide: URBEMIS2002 for Windows with Enhanced Construction Module. Version 7.4 Emissions Estimation for Land Use Development Projects. Sacramento. May.

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U.S. EPA. 2003a. AP 42. Fifth Edition. Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources.

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APPENDIX E

Demolition and Abandonment of
Atlas and Titan Heritage Launch Program Facilities
Solid Waste Management Plan

Demolition and Abandonment of Atlas and Titan Heritage Launch Program Facilities

Solid Waste Management Plan

Guidelines

PURPOSE

The purpose of this programmatic solid waste management plan is to ensure compliance with applicable federal, state and local laws and regulations, and compliance with the guidance in 30 SW plans applicable to the proposed project. Compliance with the Demolition Contract, environmental specifications section, is also required. The goals of this programmatic plan are to maximize reuse and recycling of items, materials, and demolition debris and ensure management and disposal of project wastes are conducted in compliance with regulations.

This plan describes the methods the contractor would use to minimize construction and demolition (C&D) debris generated by the demolition of Atlas and Titan facilities. Management of solid waste begins prior to the onset of the demolition project, when facilities are first returned to the Air Force. Adhering to Space Use Panel (SUP) procedures, the Base Real Estate office determines if there is an identified use or request for the newly available buildings. Only after exhausting all potential reuse or sustainability options does Real Estate place a facility on the proposed demolition list. As stated within the text of the PEA for Demolition and Abandonment of Atlas and Titan Facilities, the actual demolition process then follows a sequence of steps intended to minimize waste disposal and enhance reuse and recycling opportunities. The steps applicable to each demolition are: survey, abate, deconstruct, demolish, manage debris, and close project. The remainder of this programmatic solid waste management plan amplifies each of the steps of the proposed demolition process, and concludes with an overview of base landfill procedures.

Survey Phase of Demolition

- Identify equipment, items and materials to be removed for the DRMO RTDS, or other reuse or recycle processes
- Identify hazardous materials that require abatement prior to deconstruction and demolition
    - Research available base records
    - Conduct appropriate sampling and analysis protocols
- Identify the types and estimated amounts of materials used in each facility's construction
- Identify authorized reuse or recycle facilities that will accept materials and debris, and the conditions under which acceptance would occur
- Identify facility conditions and site constraints that could influence method(s) selected for deconstruction and demolition
- Identify exclusionary zones or areas to be avoided on or adjacent to demolition site
- Identify areas within demolition site that could be used for equipment servicing
- Identify areas within demolition sites that could be used for waste and debris segregation and management
- Identify areas within demolition site that could be used for inert debris engineered fill placement

- Prepare reports, as necessary, to document findings or propose recommendations

Debris Segregation and Management Phase of Demolition

This activity, although listed here, is done during all phases of the facilities demolition project

- Construction and Demolition Debris management requirements of the VAFB Solid Waste Management Plan will be applied to the demolition project, as appropriate
    - Requirements are not optional
- Materials shall be reused or recycled to the maximum amount possible, including:
    - . Land clearing debris
        - Removed topsoil will be used to restore site grade at the completion of demolition actions
    - Scrap metals from beams, columns, studs, ductwork, piping, rebar, roofing, siding, cladding, etc.
        - Steel, iron, galvanized sheet steel, stainless steel, aluminum, copper, zinc, lead, brass, and bronze are metals likely to be encountered
        - Metals will be reused or processed as smelter feedstock following Title 22 CCR, scrap metal management requirements
    - Clean wood, pallets, structural lumber
        - Will be reused or processed for mulch or alternate daily cover following Title 14 CCR, wood management requirements
    - Concrete, concrete masonry, bricks, tile
        - Will be reused or processed for inert debris engineered fill following Title 14 CCR, inert debris engineered fill operation requirements
    - Asphalt, asphalt shingles
        - Will be recycled following Title 14 CCR requirements and resources found on the Integrated Waste Management Board website
    - Glass and plastics
        - Will be recycled following Title 14 CCR requirements and resources found on the Integrated Waste Management Board website
    - Carpet, carpet pad/foam
        - Will be recycled following Title 14 CCR requirements and resources found on the Integrated Waste Management Board website
    - Cardboard, paper, paper packaging
        - Will be recycled following Title 14 CCR requirements and resources found on the Integrated Waste Management Board website
- Scrap metal processed by DRMO shall be segregated into ferrous and nonferrous metals, and prepared as required prior to turn-in to DRMO
- All recyclable materials will be properly recycled at the base Landfill Recycling Center, DRMO, or an off-base recycling center
    - Specifications in the demolition contract should state if use of the base Recycling Center is authorized
        - The base Recycling Center is subject to daily limits for material processing therefore, it may be necessary to identify and schedule deliveries

        - Materials sent to the base Recycling Center will be of the size, characteristic, condition and quantity required for acceptance and subsequent processing
    - Specifications in the demolition contract should state under what conditions use of off-site recycling centers is authorized
        - The demolition contractor must tell the Government Contracting Officer which recycling center(s) will be used during the contract
        - All materials leaving the base for recycling will be segregated and transported to the base landfill scale for weighing, at which time a Weight Ticket will be issued
        - Weight Tickets identifying the amount and type of recyclable material, and the off base receiving location will be submitted to the 30th Civil Engineering Solid Waste Manager (30 CES/CEV) each month that such activity occurs.
            - It is the responsibility of the contract QAE to assure these weight tickets are submitted to 30 CES/CEVV
- Materials sent to off base recycling center(s) will be of the size, characteristic, condition and quantity required for acceptance and subsequent processing
    - See list of Local Recyclers for a sampling of opportunities available
- Use of concrete and other inert debris will be placed as engineered fill at demolition sites wherever possible
    - Inert debris engineered fill operations will be conducted in accordance with (IAW) Title 14 CCR requirements
        - The engineered fill shall be constructed and compacted IAW all applicable laws and ordinances
        - The engineered fill shall be certified by a Civil Engineer, Certified Engineering Geologist, or similar professional licensed by the State of California
- While debris is on-site awaiting final disposal or recycling action, the debris will be managed to preclude improper commingling or environmental contamination
    - Recyclables will be placed in roll-off bins or other containers to maintain proper condition and segregation, and facilitate transport to authorized recycling centers
    - When not being actively filled or emptied, debris piles will be managed to prevent storm water infiltration and run-off, or other environmental contamination
- Demolition debris identified as **hazardous** waste will be managed following federal, state, and local hazardous waste laws and regulations
    - Hazardous wastes will be segregated from non-hazardous wastes
    - Hazardous wastes will be properly characterized, containerized and managed, and will be removed from demolition sites IAW Title 22 CCR, hazardous waste accumulation requirements
- Demolition debris identified as **non-hazardous** waste will be managed following federal, state, and local solid waste laws and regulations
    - Demolition debris will not remain on-site following demolition, and will be removed from sites IAW Title 14 CCR, accumulation requirements
- Base recycling and refuse containers located adjacent to facilities on VAFB are intended for solid waste and recyclables associated with the Vandenberg AFB mission, not for demolition debris
    - The demolition contractor will place solid wastes, such as food wastes from on-site meals into the designated containers so that those items do not become an attractive nuisance to wildlife or contaminate segregated demolition debris

- Contractor materials and wastes generated from off-base activities will not be brought onto Vandenberg AFB, nor will the demolition contractor use base solid waste or recycling receptacles for these materials and wastes

Abatement Phase of Demolition

- Develop required abatement plans and required regulatory submittals prior to abatement action
- Receive regulator and base approvals to proceed with proposed abatement actions
- Conduct abatement following approved plans and in accordance with (IAW) regulatory requirements using certified workers and equipment required for abatement tasks
    - Non-friable asbestos
        - Non-friable asbestos disposal is authorized at the Vandenberg AFB landfill
        - Landfill managers must be notified 24-hours in advance of non-friable asbestos deliveries to the landfill
        - Non-friable asbestos is accepted by appointment only and must be delivered on a pre-coordinated schedule
        - Prior to delivering non-friable asbestos to the landfill a manifest must be presented to the 30 CES/CEV Asbestos Manager for approval to use the landfill
        - Conduct disposal of non-friable asbestos containing material (ACM) at the landfill IAW California Health and Safety Code Section 25143.7 and RCRA (40 CFR Part 61 Subpart M).
        - Non-friable asbestos must be in closed containers or bags that can be easily inspected, or asbestos containing materials, in bulk, must be dampened and covered before shipping to the landfill
        - The demolition contractor delivers non-friable asbestos to the landfill and the demolition contractor's asbestos-trained personnel, equipped with appropriate PPE, place the load in the asbestos cell designated by landfill personnel
    - Friable asbestos, as well as all other hazardous waste generated during any and all phases of the Atlas and Titan Facilities Demolition project is managed IAW federal and state hazardous waste control laws
        - Hazardous waste generated on Vandenberg AFB uses the base's Generator ID number
        - Hazardous waste is processed following base hazardous waste management procedures
        - Hazardous waste must be properly characterized for manifest preparation
        - Hazardous waste must be placed in appropriate DOT shipping containers for transport to off-site disposal facilities

Deconstruction Phase of Demolition:

- Obtain regulator and base approvals to proceed, if not previously obtained
- In preparation for deconstruction, remove structural components, as needed, to facilitate movement into and about facility
- Remove items identified for reuse or recycle
    - Serviceable or Salvageable Items
        - A government inspector shall examine all materials removed from demolition projects

        - Serviceable or salvageable equipment items are to be identified and tagged, in preparation for turn-in to DRMO, or Base Supply, Equipment Management Section
        - Locks, latches, and cylinders must be salvaged and turned-in to the Base Lockshop
        - Serviceable or salvageable items not accepted by DRMO or Base Supply become the responsibility of the contractor to properly manage, transport, reuse, recycle or dispose of in accordance with applicable federal, state, and local requirements
            - Contract specifications will also guide contractor actions
    - Demolition debris will be segregated from serviceable or salvageable items
        - Debris will be segregated and managed to facilitate reuse and recycling opportunities and limit the need for disposal

Structural Demolition Phase of Demolition

- Conduct demolitions using methods as described and approved in the PEA
    - If methods differ from those previously assessed, follow-on assessments will be required before work can proceed
- Submit required demolition paperwork to obtain regulator and base approvals to proceed with demolition, if not previously authorized
    - Submittals requesting demolition must be sent to 30 CES/CEV 15 days prior to the intended demolition start date
    - Explosive demolitions require special approvals and coordination and must be submitted to the base Safety office 60 days prior to the intended use of explosives
    - Demolition equipment requiring local APCD approval or state registration may not be brought on to Vandenberg AFB until regulator and base approvals have been granted
- The various type of demolition debris will be segregated and managed to maximize reuse and recycle opportunities, and to minimize waste disposal requirements

Site Closure Phase of Demolition:

- Upon completion of demolition actions, whether partial or complete removal of structures has occurred, all contractor materials and equipment; and demolition debris and wastes will be removed from the site
    - Actions will be IAW federal, state, and local regulations; and contract specifications
    - An Air Force contract acceptance inspection will be performed
    - Those portions of facilities to remain abandoned will be inspected by base personnel and will conform with 30 SWI, 32-901, Facility Closure/Turn-In Procedures

Procedures Used at the Vandenberg AFB Sanitary Landfill

Procedures enumerated here will be validated upon initiation of the contract, since items are subject to change over the possible 10-year duration of this project. A list of waste not accepted at the Vandenberg AFB Sanitary Landfill is included at the end of this Plan.

- Demolition contract specifications will allow use of the base landfill, as beneficial to the government
    - The Demolition Contract and Base Solid Waste Management Plan are the primary references for actions specified below
- Unusable items (not salvageable items) will be transported to the landfill as directed by the Contracting Officer or Contracting Officer Representative (COR)

- The COR inspects all loads and issues a landfill access ticket
    - The ticket verifies that the refuse was generated by a VAFB project
    - Issuing of the ticket does not relieve the contractor from properly managing, transporting, and disposing of the refuse
    - Items inappropriate or unacceptable for disposal in the base landfill become the responsibility of the contractor
        - The contractor will comply with all regulations that pertain to the management of such items and have them appropriately managed at an off base location
- A tarp or similar item will be used to cover wastes transported on Vandenberg AFB
    - Transport off base will be IAW DOT and State of California regulations
- Truck identification at the base landfill is accomplished using:
    - The transporter/hauler identification number posted on the cab door, or
    - If there is no identification number, the last four numbers of the license plate
    - An authorized truck list is maintained at the scale house and is based on:
        - An approved landfill access ticket
        - Truck identification number or license plate for trucks that have been previously processed at the scale house
- Scale House Procedures
    - Truck pulls onto the scales
    - The truck number is recorded by the scale house attendant
    - The scale house attendant inspects the load to ensure there is no hazardous, designated, liquid, or other unauthorized waste present in the load
        - Approved loads are directed to the proper location at the landfill
        - Rejected loads are prohibited from using the landfill, and are directed to the point of waste generation so that the generator can correct load acceptance discrepancies
        - Loads brought to the Scale House by haulers not affiliated with the waste generator (subcontractors or roll-off companies hired by the demolition contractor), must provide name and haul account initials of the contractor that generated the waste and whose contract authorizes use of the base landfill
    - The scale house attendant prints a landfill weight ticket
        - The truck driver writes the contract number, the building number or location where the waste was generated, signs the ticket and keeps the duplicate copy for company records
        - The scale house attendant keeps the original copy of the weight ticket

Local Recyclers Contacted During April 2005

Name	Accepted Materials	Location	Phone	Conditions of Acceptance	Fees
Atlas Performance Industries	All C&D	Santa Maria	(805) 928-8689	Provides roll-off at a discounted price dependant upon value of materials being disposed. Better rates for segregated materials.	Approx. $95/hr trucking fee, plus disposal fee or minus recycling credit
Bedford Enterprises	All C&D	Santa Maria	(805) 922-4977	No restrictions on concrete or metal, no special requirements, but cost will reflect quality of material. Willing to work out special rates for VAFB if high volume.	$3.50/ton clean $10/ton Large size $30-45/ton Mixed dependant on volume
Marborg Disposal Co.	All C&D	Santa Barbara	(805) 963-1852	Free Scrap Metal drop off No treated wood No restrictions on concrete size or rebar	$15/ton min. $40/ton wood $15/ton concrete $58/ton mixed rubble
Hansen Aggregates	Concrete, asphalt	Long Beach	(800) 300-6120	Only clean concrete and asphalt No protruding rebar 2' X 2' X 6" size limit	Fee determined by truck size (ex. Semi's charged $150/truck)
Gator Crushing and Recycling	Concrete, asphalt	Arroyo Grande	(805) 343-6277	Price increases with size of material or presence of rebar/contamination	Minimum of $4.50/ton or $20/load
Granite Construction Co.	Concrete, asphalt	Buellton	(805) 693-1321	Concrete under 24" (small amounts of rebar usually ok) considered clean. Over 24" or lots of rebar charged extra	$5/ton clean $25/ton dirty/large/rebar
Troesh Demolition	Concrete, asphalt	Santa Maria	(805) 928-3764	Concrete 2'x2' w/ minor rebar extending less than 3" $3.75/ton. Lots of rebar $5.50/ton. Large pieces up to 4'x4' $7.50/ton. Large w/ rebar $10/ton. Extremely large $15/ton. Small amounts of dirt and asphalt ok, no clay or organics.	
V&J Rock Transport	Concrete, asphalt	Lompoc	(805) 736-2317	No vegetation, trash, or wood mixed w/ concrete, only minimal dirt. Over 24" oversized. Trimmed w/ steel means no steel showing (ex. Wire mesh). Untrimmed w/ steel means anything protruding.	By the truck load. $45/semi clean $90/semi trimmed or oversize $135/semi untrimmed or oversized
Lash Construction	Concrete	Santa Barbara	(805) 963-3553	No rebar, no wire mesh, no dirt, must be 2'X2' or smaller.	Based on truck size, min. of $20 (pickup truck)
M&M Metals	Scrap Metals (Ferrous and non-ferrous)	Santa Barbara	(805) 964-9128	Quantities greater than one ton Won't pay for ferrous metals Prefer 12' lengths, but can pickup up to 25' lengths	N/A

NOTE:

Another resource for comparison of available landfill facilities can be found at:
http://www.countyofsb.org/pwd/rrwmd/MJSWTG/MJAgendasandDocs.htm

Types of Waste Not Accepted at the VAFB Landfill

- Hazardous Waste – as defined in 40 CFR 260
- Non RCRA Hazardous Waste - per 22 CCR 66260.10
    - A HW as defined in 22 CCR 66261.3; includes
- Extremely HW, Acutely HW, Special waste.
- Universal Waste – as defined in 22 CCR 66273.
- Prohibited Waste – As identified in Waste Discharge Permit
    - Solid waste containing free moisture;
    - Dry-cleaning fluids;
    - Paint sludge (not solidified);
    - Liquid waste including grease and sludge;
    - Sewage sludge/septic waste;
    - Burn debris;
    - Hot ash;
    - Untreated medical waste;
    - Treated wood waste as defined in California Health and Safety Code Section 25150.7.
- Designated wastes - as defined in California Water Code §13173
    - These are waste that have the potential to affect water quality either by quantity, constituent or form
- Contractor or commercially generated wastes for which the entity has off base disposal responsibility under specific terms of their contract or operation
- Decommissioned Materials – Cleanup Abatement Order R3-2002-0130
    - Prohibits disposal of radioactive materials in excess of local background levels